CINCINNATI COAL MINING CONVENTION AND EXPOSITION NUMBER

COAL AGE

The World's Accepted Authority on Coal Mining

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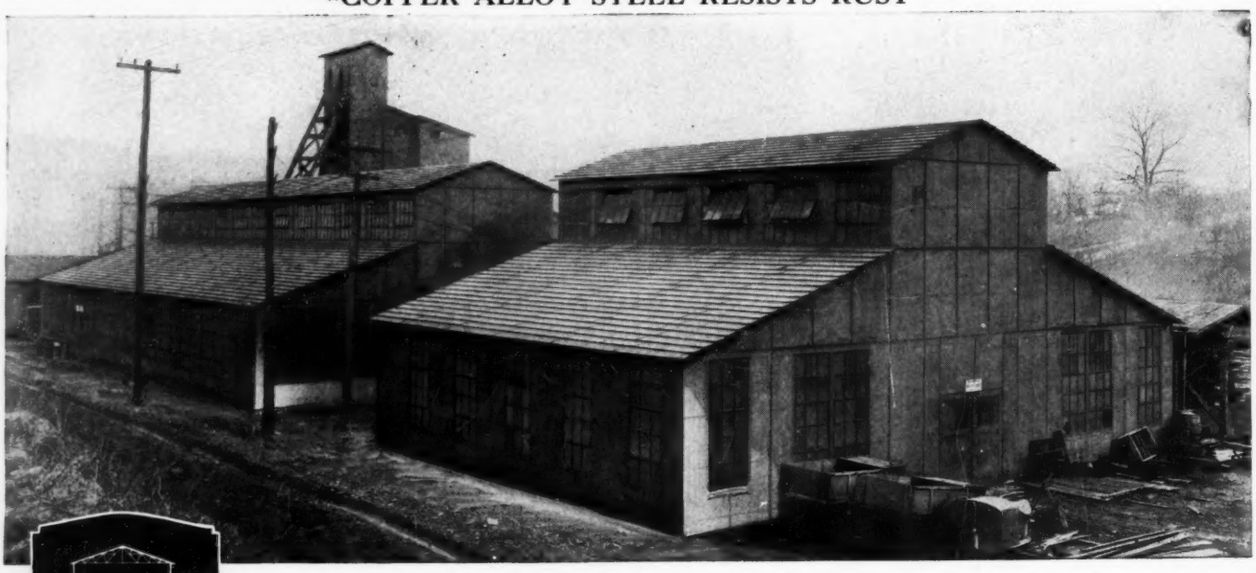

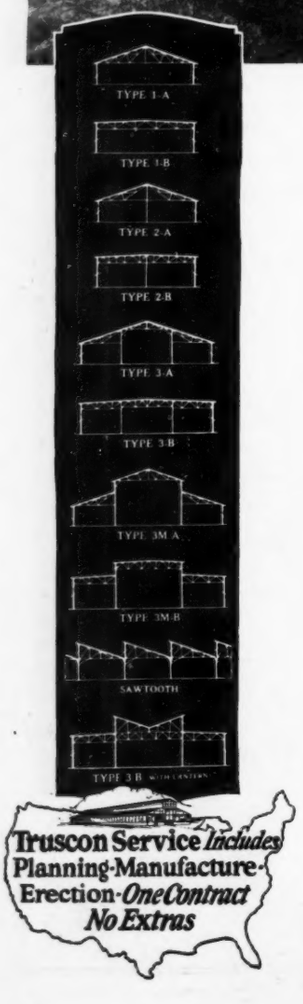

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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Volume 29 — New York, May 20, 1926 — *Number* 20

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COAL AGE

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JEROME C. WHITE
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Assistant Editors
PAUL WOOTON
Washington Correspondent

With which is consolidated "The Colliery Engineer" and "Mines and Minerals"
R. DAWSON HALL, *Engineering Editor*

Hope You Will Be There

At Cincinnati will be found all those who have elected to continue in the business of mining coal and who, therefore, are desirous of learning what must be done in order to bring their mines up to date. One cannot waste the time of men, or the power purchased or generated and still continue in the market. We have seen men so busy that they never had time to look at a watch or clock or to consult a timetable, and so they failed to arrive anywhere, at least in time to perform what they had on hand. Others will not take the time to consult maps, the compass or the policeman, and so they spend their time in traveling in the wrong direction. The man who will not attend conventions has nothing on these unwise persons.

In Regard to This Issue

By the way, the convention issue is, we feel, as notable as the convention itself. Mr. Brosky, by whom it was gathered together, labored to make it representative of all phases of mining. Space prevents giving reference to the good things which the issue contains, but when you have read the articles you will realize the depth and breadth of their interest.

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What's New

O-B Bulldog Cable Clamp

A cable sling with clamping jaw adapted to the old reliable Bulldog clamping principle. Cable gripped tightly, relieving strain on dead-end.

O-B 3-Spool Feeder Insulator

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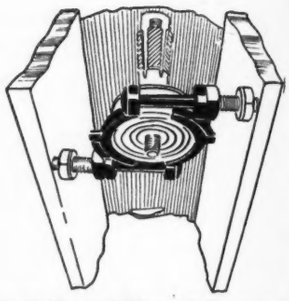

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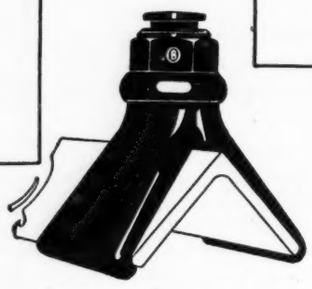
Combine trolley and feeder wire suspension on one set of insulated hangers. Two styles. "A" supports trolley from feeder as messenger, between hangers. Hangers hold feeder wire or cable in sling. "B" attaches direct to the hanger.



O-B Bulldog Angle Iron Clamp

Suspends inverted 2½ by 2½-inch angle iron used as a trolley. Again the old reliable Bulldog clamping principle.

O-B Cam Grip Splicer

Cam-shaped dogs, with milled teeth, bite into trolley wire. Cam, wedging action increases grip as tension increases. Set screws merely hold dogs in place.

COAL AGE

McGRAW-HILL PUBLISHING COMPANY. INC.
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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

R. DAWSON HALL
Engineering Editor

Volume 29 | NEW YORK, MAY 20, 1926 | Number 20

Cincinnati's Coal-Operating Officials' Convention And Mine Machinery Exposition

IN earlier days, conventions, when they met, discussed "How things are done" and even sometimes "How they used to be done," but today we are more interested to know "How they can and will be done," for we realize that they cannot continue as they are. The old formularies are giving place to new. Change is in the air. Every industry wears a new garb every time we look at it, and the business of getting out coal would be unlike all others if it did not change with the rest. And that it does change everyone will have to acknowledge if he glances back a few brief years.

No longer does the interest in past ways and means hold us back. No one now values experience solely because it is of long standing. A practice is no longer cherished because it is moldy with age. The coal industry realizes that a revolution in methods is on the way. One function of human hands and muscles after another has been taken over by machinery. Haulage, hoisting, and kerf-cutting are almost everywhere and entirely machine-performed operations. A few mules and horses remain and in some mines coal is still, at least nominally, undercut by hand. These are almost the sole reminders—other than loading and drilling—of a bygone age, and they are exceptions to a rule of progress that is almost universal in America, namely to let electricity do the work, more cheaply, more speedily, more cleanly and with less effort on the part of the workmen.

The change that has come to hoisting, haulage and kerf-cutting must come to loading and drilling along with the rest. Hand operations are not more burdensome than they are costly.

* * *

Time was when it was the raw-material industries that made the big engineering advances. It was mining that fostered pumping and ventilation, that gave us the steam engine, the fan, the locomotive, the cross-tie and the metal rail. That was a day when manufactured articles were of no great intricacy. Today mining finds a host of rivals, if they may be so termed—many of them more enterprising than itself. Why does not mining take counsel with these, choosing out men who have had contact with, and perhaps have originally come from, those industries. More outsiders should be absorbed into the staffs of coal companies to devote their peculiar talents to its specialized needs.

Because of these diversities of men and of experience one is sure to find in a big convention what cannot be found at home—peculiar geniuses who have unusual slants on certain problems, slants derived doubtless from their specialized experience and the exceptional circumstances at the manufacturing plants at which they have worked or at the mines which they have directed.

At the American Mining Congress' Annual convention of coal-operating officials in Cincinnati May 24-28 will be presented the opinions of the men who are foremost in promoting the new principles of mining. In the exposition will be seen the newest devices developed for the use of mining men, results of the expert ability that the manufacturers' staffs exhibit.

* * *

And, be it noted, the manufacturer has not been slow to get his men from all quarters and to get ideas from all sections and all industries. He has summoned specialists from every department of engineering that could be helpful to him in his endeavor. The larger manufacturers are interested in nearly all industries. Their products spread the country over, and they would be slow indeed if they did not seek to include in their personnel those skilled in the various industries in which their product enters as well as those who are experienced in the making of that product.

In these days when the mining manager has to cover so many lines of engineering and cannot do it with any degree of satisfaction except by absorbing the predigested knowledged of other men, a trip to a convention like that to be held at Cincinnati is absolutely necessary to keep him in touch with new developments.

In his isolation in the hills of the East and West and in the boundless prairies that lie between, he is liable to fail to realize the progress in other centers and to believe that what problems he is discussing day by day with his associates and cronies and what solutions he is finding in his intercourse with his fellows are all the problems and all the solutions he needs to recognize. But where he meets the full strong current of life among groups of mining men, he learns that there are other problems and other means of solution than those he has at any time considered.

* * *

Most of us believe we have problems enough without traveling anywhere to find more. Unfortunately Nature has a way of working her will with us without our realizing what problems really confront us. There was a coal-dust problem before we knew that coal dust would explode. There is now a loading-machine problem confronting the man who has no machines, but who has a cost-of-coal problem into which he should look carefully. He can do it only by considering what machines and conveyors can accomplish for him. So easy it is, if we live hidden in the hills or isolated by farms,

or immured in cities where coal is sold, not mined, to believe that we are doing the best that opportunity affords, making petty decisions when larger ones can alone save the situation, meticulously counting the pennies while letting the double eagles slip by us. Here, in Cincinnati, is a chance to see the industry in a large way and to turn loss into profit.

A word regarding a few of those who will take part in the discussions will be of interest in showing their varied backgrounds and will explain why they have been chosen by the committee to discuss the subject assigned. Some of the outstanding men are omitted as their affiliations and record are well known.

C. W. NELSON, of South Brownsville, Pa., who will discuss cushioned blasting, graduated from Carnegie Institute of Technology in 1923 in mining engineering and was elected to a research fellowship in mining. He spent a year in research on efficiency in blasting coal. At the conclusion of these studies he received the degree of Master of Science in Mining Engineering at Carnegie Institute of Technology and then became explosives engineer for the Hillman Coal & Coke Co.

E. H. JOHNSON, who will discuss machine-loading failures and their reasons, was research fellow of the Carnegie Institute of Technology and joint author with F. E. Cash of the bulletin "Mechanical Loading in Coal Mines." He graduated from the Carnegie Institute of Technology in 1922 and received his master's degree in 1925. He is now engineer and sales manager of the Coloder Co., at Columbus, Ohio.

JOHN T. RYAN, who will speak on "sealing fires in gaseous mines," received the degree of bachelor of science in mining engineering from Pennsylvania State College in 1908. From 1908 to 1910 he did mining engineering work in Huntington, Pa. In the latter year he became superintendent of the Rocky Ridge Coal Mining Co., at Dudley, Pa., and superintendent and engineer of the Langdon Coal Co., at Hopewell, Pa. From 1911 to 1913 Mr. Ryan was successively rescue foreman, junior mining engineer and assistant mining engineer of the U. S. Bureau of Mines at Pittsburgh, Pa. In 1913 he accepted a position as mining engineer in charge of field work for the navy in Alaska. In 1914 he became assistant mining engineer of the Bureau of Mines at Urbana, Ill. In the same year he helped organize the Mine Safety Appliances Co., of Pittsburgh, Pa., of which firm he is now vice-president and general manager.

JAMES O. HANDY, of Pittsburgh, Pa., was the expert retained in 1925 in the water-pollution case of the Mountain Water Supply Co. (Pennsylvania R.R.). He will address the convention on mine-water purification. A graduate of the Massachusetts Institute of Technology, 1886, he aided in the design of the water-softening plant at Winnipeg, Man., Canada. He is director of the chemical and metallurgical investigations of the Pittsburgh Testing Laboratory.

H. L. STEVENSON, who will speak on "Stream Pollution" is a member of the American Society of Civil Engineers and chief engineer of the Pennsylvania Department of Health as well as being chief engineer and secretary of the Sanitary Water Board of Pennsylvania. He was formerly sanitary engineer and assistant director of the Department of Health, Emergency Fleet Corporation, U. S. Shipping Board. He was also at one time assistant engineer in charge, Sewage Disposal Division, City of Philadelphia.

B. L. LUBELSKY, who presents an article in this week's issue and discussion on blasting coal for mechanical loading at the convention, graduated in 1924 at the University of Illinois with the degree of bachelor of science in mining. In 1924 and '25 he was research fellow at Carnegie Institute of Technology and assisted in the preparation of Bulletin 19 on lump-coal production, being given the degree of master of science by Carnegie Institute of Technology. On Jan. 15 of this year he associated himself with the Pittsburgh Coal Co. as explosives engineer supervising safety, economy and efficiency in the use of explosives.

W. J. O'TOOLE, graduated as bachelor of arts at the Catholic University of America, in 1915. From 1915 to 1917 he was secretary and treasurer of three coal companies and from 1919 to 1922 sales manager of the Central Pocahontas Coal Co. From 1922 to 1924, he was American Minister to Paraguay. In the latter year he became general manager of the American Coal Cleaner Corporation.

ROBERT S. WALLACE, who speaks on mechanical loaders, is a native of Scotland, entered the mines as a trapper boy at the age of thirteen years. He came to the United States in 1903 and accepted a position as fireboss with the New River Smokeless Coal Co., where he was made mine foreman and later superintendent. After passing the West Virginia examination for mine inspector, he in 1909 accepted the position of chief mine inspector with the Pocahontas Fuel Co., Inc., with headquarters at Pocahontas. He is still at the same place but now as superintendent.

GLENN B. SOUTHWARD, consulting mining engineer, began his professional experience by inspecting coke in the summer of 1906 for the U. S. Coal and Coke Co., of Gary, W. Va. In 1907 he served as transitman for the Interstate Railroad Co., at Stonega, Va. In 1908 he graduated from the Ohio State University with the degree of engineer of mines. He was employed by the Stonega Coke and Coal Co., Stonega, Va., until 1911 when he went with the Log Mountain Coal Co., at Chenoa, Ky. as mining engineer. In 1912 he returned to the Stonega Coke and Coal Co., as assistant chief engineer with headquarters at Big Stone Gap, Va. From 1917 to 1925 he served as chief engineer with the West Virginia Coal and Coke Co., at Elkins, W. Va. Here he developed the V-system of mining. From 1925 until the present time he has been a consulting mining engineer of Elkins, W. Va.

CHARLES ENZIAN, who will discuss the advantages of rock dusting, has had a varied experience. A graduate of Lehigh University, he was for nine years a mining engineer with the Lehigh Valley Coal Co., with the U. S. Bureau of Mines for six years, and with the Philadelphia & Reading Coal & Iron Co., for five years. He was president and manager of the Liberty Coal Corporation of Kentucky for two years and for the past three and a half years he has been mining engineer for the Berwind-White Coal Mining Co., of Windber, Pa.

JOSIAH KEELY, who will speak on roof control, was born in a cabin near Charleston, W. Va. He was educated for the ministry, graduating from the University of West Virginia in 1896. After teaching for several years he took his master's degree in English at Harvard in 1904. He then engaged in educational work but resigned as principal of the Preparatory Branch of the West Virginia University in 1907 to accept a position in a mine office. After the only fight of his life (wherein he "licked" the local "badman"), he was

promoted to the superintendency of the mine, having meanwhile taken a mining course in the International Correspondence Schools. He devoted his attention to the underground, and in a few months was promoted to assistant general superintendent of a company operating 44 mines. In 1913 he took charge of the Cabin Creek Consolidated Coal Co., of which he is now the president.

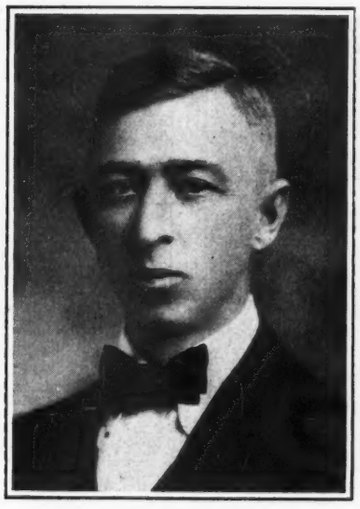
AMOS A. CULP, a consulting engineer for railway and mine trackage of Birmingham, Ala., who was, from 1919 to 1924, chief engineer of the railroad department of the Woodward Iron Co. and made the standards for that firm's underground trackage will deliver an address on the importance of good track. He has been connected with the Louisville & Nashville, the Southern, and the Pennsylvania railroads as well as the city of Philadelphia.

NIXON W. ELMER, a consulting material-handling engineer of Quincy, Mass., will present discussion on inside mine conveyors. He received a degree from Cornell in 1904. With a long experience in design and construction of conveying systems as a background, Mr. Elmer started, as a pioneer in the profession of a consulting material-handling engineer. In this capacity he has served such organizations as the Berwind-White Coal Mining Co. and the United States Smelting & Refining Co. (The United States Fuel Co.).

C. H. NESBIT who will discuss the volume of the air that should be sealed in with a mine fire, was a mining engineer in Indiana for six years and in Alabama for fifteen. For another fifteen years he has been chief mine inspector for the State of Alabama with headquarters at Birmingham.

WILLIAM J. GERMAN, who will discuss "Mechanical Loaders in Pillar Work," has spent several years in a study of the best methods of shooting down coal for loading out by machine. During the late war Mr. German served as a captain of engineers in France.

A. W. Dickinson



F. G. Wilcox

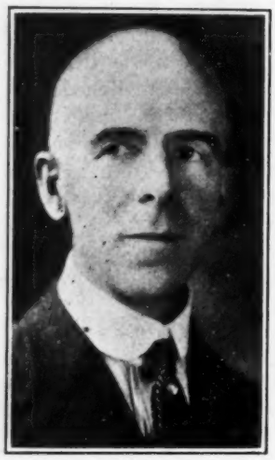
J. T. Ryan

C. W. Nelson

James Needham

E. H. Johnson

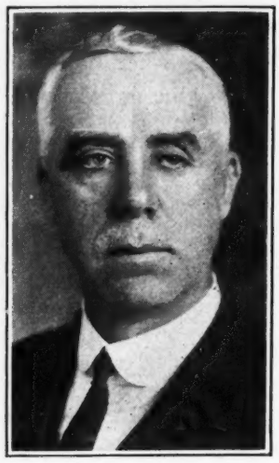
Some of Those Who Will Present Discussion



J. O. Handy

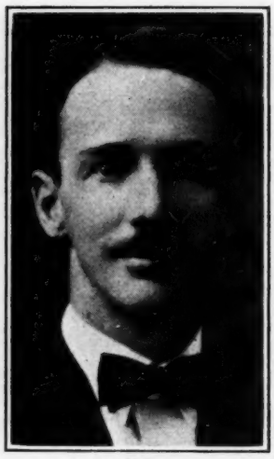
B. L. Lubelsky

W. J. O'Toole



R. S. Wallace

I. N. Bayless



Glenn Southward

Charles Enzian

Josiah Keely

A. A. Culp

N. W. Elmer

C. H. Nesbitt

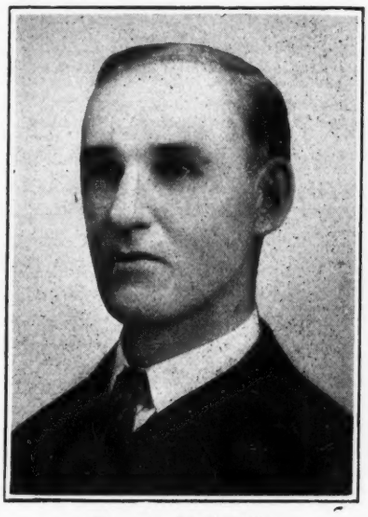
W. J. German

Some of the Expert Engineers Who Will Discuss Certain Phases of Mining

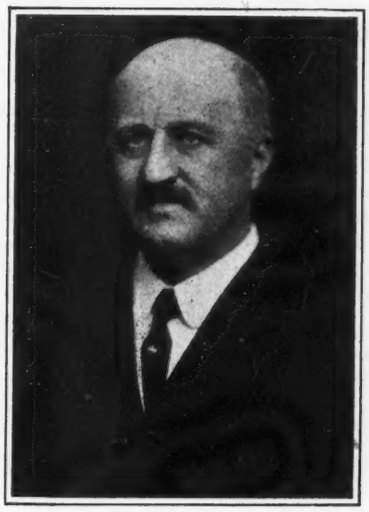
Convention's Distinguished Chairmen

H. N. Eavenson

J. J. Rutledge



Eugene McAuliffe



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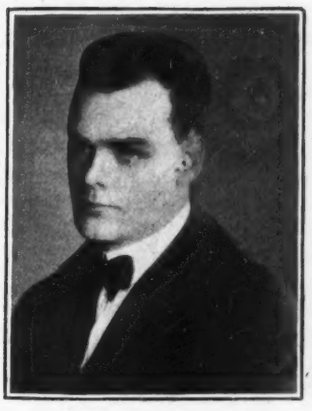


R. L. Kingsland

Operating Officials Who Will Address Cincinnati Convention And the Subjects They Will Discuss

TUESDAY, May 25, 10 a.m. to 12 noon
CHAIRMAN—SAMUEL A. TAYLOR

SUBJECT: MINE DRAINAGE

1. **"Relation of Mine Drainage to Stream Pollution."**
   By Andrew Crichton, cons. engr., Johnstown, Pa.
   Discussion—Howard N. Eavenson, Pittsburgh, Pa.
2. **"Mine Water Purification."**
   By Jas. O. Handy, director, Pittsburgh Testing Laboratory, Pittsburgh, Pa.
3. **"Restriction of Stream Pollution."**
   By Wm. L. Stevenson, ch. engr., State Health Dept., Harrisburg, Pa.

TUESDAY AFTERNOON, 1:30 to 3:30
CHAIRMAN—WILLIAM L. AFFELDER

SUBJECT: CUTTING AND BLASTING COAL

1. **"Recent Experience in Shearing and Blasting."**
   By L. E. Young, genl. mgr., Union Collieries Co., St. Louis, Mo.
   Discussion—I. N. Bayless, supt., Union Colliery Co., Dowell, Ill.
2. **"Blasting Coal for Mechanical Loading."**
   By B. L. Lubelsky, explosives engr., Pittsburgh Coal Co., Pittsburgh, Pa.
   Discussion—David Ingle, Oakland City, Ind.
3. **"Results from Cushion Blasting."**
   By C. W. Nelson, explosives engr., Hillman Coal and Coke Co., Pittsburgh, Pa.
   Discussion—John G. Bart, Union Collieries Co., Renton, Pa.
4. **"Cutting in Fire Clay Bottoms."**
   By W. J. Freeman, Fayette Realty & Development Co., Terre Haute, Ind.
   Discussion—John L. Clarkson, Clarkson Coal Mng. Co., Nashville, Ill.

WEDNESDAY, May 26, 10 a.m. to 12 noon
CHAIRMAN—EUGENE MCAULIFFE

SUBJECT: MECHANICAL LOADERS

1 **"Mechanical Loaders That Have Operated Successfully at the Face and Their Operating Costs."**
   By A. W. Dickinson, gen. supt., Union Pacific Coal Co., Rock Springs, Wyo.
   Discussion—Wm. J. O'Toole, Welch, W. Va.
2. **"Machine Loading Failures and Reasons Therefor."**
   By H. F. McCullough, engr., H. C. Frick Coke Co., Scottdale, Pa.
   Discussion—Edwin H. Johnson, Columbus, Ohio.
3. **"Best Methods of Adapting Present Mining Systems to Mechanical Loading."**
   By W. L. McCoy, mine inspector, Bertha Consumers Co., Rachel, W. Va.
   Discussion.
4. **"Getting Cars to and from Mechanical Loaders."**
   By Chas. Gottschalk, cons. engr., Evansville, Ind.
   Discussion—F. F. Jorgensen, cons. engr., Superior Coal Co., Gillespie, Ill.

WEDNESDAY AFTERNOON, 1:30 to 3:30
CHAIRMAN—JAMES ELWOOD JONES

SUBJECT: MECHANICAL LOADERS

1. **"Methods for Mining Thin, Flat Seams with Mechanical Equipment."**
   By J. F. K. Brown, chief engr., Hudson Coal Co., Scranton, Pa.
   Discussion—Fred G. Wilcox, West End Coal Co., Scranton, Pa.
2. **"Mechanical Loaders in Pillar Work."**
   By Robt. Wallace, supt., Pocahontas Fuel Co., Pocahontas, Va.
   Discussion—W. J. German, E. I. DuPont de Nemours & Co., Huntington, W. Va.
3. **"Mechanical Loading in Rooms and Entries."**
   By I. N. Bayless, supt., Union Colliery Co., Dowell, Ill.
   Discussion—Jas. Needham, gen. supt., St. Paul Coal Co., Chicago, Ill.
4. **"Mechanical Loading of Top and Bottom Rock in Entries."**
   By A. C. Hohnke, supt., Russell Coal Mng. Co., Clymer, Pa.
   Discussion—F. M. Fritchman, gen. mgr., B. R. & P. Coal Co., Indiana, Pa.

THURSDAY, May 27, 10 a.m. to 12 noon
CHAIRMAN—HOWARD N. EAVENSON

SUBJECT: UNDERGROUND CONVEYORS

1. **"Inside Mine Conveyors."**
   By Nixon W. Elmer, cons. engr., Quincy, Mass.
   Discussion—Glenn Southward, Coal Service Corp., 2 Rector St., New York City.
2. **"Room and Pillar Mining with Conveyors."**
   By R. A. Suppes, gen. supt., Knickerbocker Smokeless Coal Co., Johnstown, Pa.
   Discussion—S. W. Blakeslee, supt., Penn Coal & Coke Corp., Ehrenfeld, Pa.
3. **"Mining Plans for Different Types of Conveyors."**
   By Heber Denman, pres., Paris Purity Coal Co., Clarksville, Ark.
   Discussion—Clarence R. Claghorn, 715 Continental Bldg., Baltimore, Md.

THURSDAY AFTERNOON, 1:30 to 3:45
CHAIRMAN—J. J. RUTLEDGE

SUBJECT: ACCIDENT PREVENTION

1. **"Proven Advantages of Rock Dusting."**
   By Geo. B. Harrington, pres., C. W. & F. Coal Co., Chicago, Ill.
   Comments—J. E. Jones, safety engr., Old Ben Coal Corp., West Frankfort, Ill.; Chas. Enzian, chief engr., Berwind-White Coal Mng. Co., Windber, Pa.; T. E. Jenkins, v.-p., West Kentucky Coal Co., Sturgis, Ky.; George F. Osler, v.-p., Pittsburgh Terminal Coal Co., Pittsburgh.
2. **"Sealing Fires in Gaseous Mines."**
   a. "Current Practice," by John T. Ryan, Pittsburgh, Pa.
   b. "Territory Required," by Chas. H. Nesbitt, Chief Inspector of Mines, Birmingham, Ala.
3. **"Fire Protection Underground."**
   By Wm. Z. Price, asst. supt., Buckeye Coal Co., Nemacolin, Pa.

FRIDAY, May 28, 10 a.m. to 12 noon
CHAIRMAN—L. E. YOUNG

SUBJECT: ROOF CONTROL AND MINING METHODS

1. **"Elements of Roof Control."**
   By H. F. McCullough, engr., H. C. Frick Coke Co., Scottdale, Pa.
   Discussion—R. Y. Williams, cons. engr., Bethlehem, Pa.
2. **"Roof Control on Long Faces."**
   By E. F. Woodson, gen. supt., Crowe Coal Co., Henrietta, Okla.
   Discussion—W. D. Brennan, gen. mgr., Phelps-Dodge Corp., Dawson, N. Mex.
3. **"Control of Roof in the Eagle Seam."**
   By Josiah Keely, pres., Cabin Creek Cons. Coal Co., Kayford, W. Va.
   Discussion—A. A. Gallagher, gen. mgr., Milburn By-Products Coal Co., Milburn, W. Va.
4. **"Recent Developments in Roof Control."**
   By Wm. C. Stratton, chief engr., U. S. Coal & Coke Co., Gary, W. Va.
   Discussion—Thos. H. Clagett, Bluefield, W. Va.

FRIDAY AFTERNOON, 1:30 to 3:30
CHAIRMAN—R. L. KINGSLAND

SUBJECT: UNDERGROUND TRANSPORTATION

1 **"Importance of Good Track for Safe, Efficient and Low Cost Haulage."**
   By A. A. Culp, cons. engr., Birmingham, Ala.
   Discussion—T. B. Dryer, asst. genl. supt., Sloss-Sheffield Steel & Iron Co., Birmingham, Ala.
2. **"Track Work, Details and Maintenance."**
   By Fred C. Hohn, cons. engr., 1429 Wyoming Ave., Scranton, Pa.
   Discussion—Thomas DeVenny, Portsmouth By-Product Coke Co., Edgarton, W. Va.
3. **"Selecting a Mine Car Design."**
   By Clarence E. Watts, mech. engr., Berwind-White Coal Mining Co., Windber, Pa.
   Discussion—W. D. Hockensmith, Penn, Pa.
4. **"Dispatching for Long Haulage."**
   By J. B. Hicks, Elec. Engr., Consolidation Coal Co., Fairmont, W. Va.
   Discussion—Thos. G. Fear, genl. mgr., Inland Collieries Co., Indianola, Pa.

Mine in Scotts Run District Removes Pittsburgh Coal By Aid of Conveyors

Long-Face Operation—Seven Men Daily Take One Cut Which Yields 100 to 120 Tons—No Difficulty Yet Experienced in Controlling the Roof and Holding Typical Drawslate

By Alphonse F. Brosky
Assistant Editor, *Coal Age*,
Pittsburgh, Pa.

LONG FACES AND CONVEYORS have been in the foreground of discussion and experiment in recent months as means for reducing the expenditure of labor in the mining of coal, but doubt has been expressed as to the possibility of extracting the Pittsburgh seam in such a manner and with such assistance. The drawslate is so thick and so heavy and in places the sandstone above is so little disposed to break that experts are puzzled. Between the rock that breaks too easily and that which resists breakage too resolutely, the operator is perplexed. The former rock makes trouble by breaking as soon as the coal is removed even over a small span; the latter rock refuses to break even when the spans are large, and brings terrific pressures on the face, cribs and posts. Can these difficulties be met successfully?

The Connellsville By-Product Coal Co., which operates its No. 1 mine on Scotts Run, about three miles north of Morgantown, W. Va., hopes it has solved the problem but hesitates to declare that it has been successful till it has had more experience. It has extracted the coal over a large area with a substantial decrease in the labor force and it has obtained a large proportion of minable coal in the seam—practically all of it—but there is still the problem of its control of the roof. Is it solved? The company officials admit that they are not sure.

This, however, is certain: Every day seven men take one cut from a long face and thereby produce 100 to 120 tons, one-third of which is shot down onto the face conveyor.

As shown by Fig. 1, the 85-ft. faces are laid out in 300-ft. blocks, which are separated by pairs of 10-ft. rooms on 25-ft. centers. Faces are developed on the inby end of these blocks by a crosscut which is driven from one pair of rooms to the next. The face pillars and intervening room pillars thus developed may be said to be mined advancing; but in respect to the butt entries from which they are developed they may be said to be recovered retreating. The small pillars between pairs of rooms are recovered by pick work and the coal is loaded into mine cars by hand. A cutting machine is used wherever conditions favor.

The Pittsburgh seam, which is that worked in this mine, has in this section an average thickness of about 8 ft., of which only 6 ft. is taken. A bed of impure coal 6 in. thick is left in the bottom and that coal which lies above the 6-ft. breast of clean coal is left in the roof. The roof coal, high in ash and sulphur, is separated from the clean breast coal by a parting of bony shale. Above the seam are the customary drawslate and a cover 300 to 400 ft. thick. This roof coal, assisted by props and cribs, keeps in place the drawslate, which otherwise would require handling and gobbing, thus making it possible to mine the coal with economy on a long face, provided, as said before, the overlying cover can be controlled.

TWO MEN BY NIGHT AND FIVE BY DAY

A night crew of two men and a day crew of five men jointly complete the mining of one cut a day, performing all operations between and including those of cutting and loading. The only additional labor required is that employed at intervals in moving the conveyors from one face block to another. A plan is contemplated which, if adopted, would reduce by more than one-half the labor involved in moving the conveyors. In the proposed layout two rows of blocks would be developed end to end between double-heading butt entries. These rows would be separated by a single-heading butt entry which would serve as a haulage road while the first of the pair of end-to-end blocks would be mined.

When the two night men arrive at the place at the beginning of their shift they find the face cleaned up. Between the face and a row of cribs is a 7-ft. span of unsupported roof. The face conveyor, which is 28 in. wide, lies 1 to 1½ ft. in the clear of the line of cribs and about 3 ft. clear of the face.

The chief duties of the night crew are those of cutting and drilling. Whatever time remains after the face is cut is spent by these men in preparing the cut by loading out bugdust and moving the conveyor to a position abreast of the face. Whenever the face shows

The longface illustrated in the headpiece is snubbed so as to accommodate a conveyor which is placed under the cut. A single row of cribs is erected 7 ft. from the prepared face and 13 ft. from the back of the cut. Four men and a conveyor runner comprise the day shift. The night shift is composed of two men. These seven men produce as much as 120 tons a day from one 85-ft. cut.

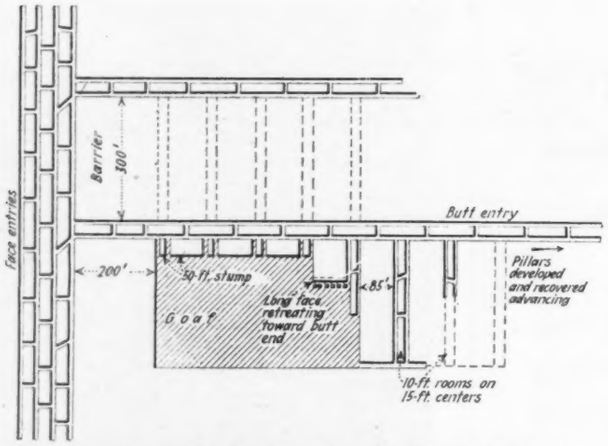


Fig. 1—Long-Face Layout Connellsville By-Product Coal Co.'s Mine

The faces are developed 85 ft. long on blocks which are 300 ft. long. These blocks are separated by pairs of 10-ft. rooms on 25-ft. centers. Panels thus constituted are mined advancing.

signs of taking more than ordinary weight, the shot-holes are drilled before the face is undercut. Generally the drilling is left until the end of the night shift or, if sufficient time is not available, until the beginning of the day shift. More will be said about the drilling later.

The face is undercut to a depth of 6 ft. by a longwall machine. A shortwall cutter of course, would require more clearance between the conveyor and the face than conditions would allow. The cut is started at the goaf end of the face so as to finish at the open end, outby of which point it is stored between cutting cycles. As shown in Fig. 3, a small rib, about 12 in. wide, is left on the goaf end of the face to hold back the loose material in the goaf, which otherwise would roll out beyond this end of the face. The cutting cycle of the 84-ft. kerf on the 85-ft. face requires 4 to 6 hours, of which only about 1 hour is consumed in actual cutting. As the coal is hard, bits must be changed frequently and the machine must as many times be pulled out and sumped in, which accounts for much of the lost time. Some time also is lost in moving the machine to the goaf end of the cut so that cutting may commence. The time required for this operation no doubt will be much reduced after the crew becomes more accustomed to longwall cutting.

Bugdust Loaded Before Shooting

Having completed the cut the men then load the bugdust onto the conveyor, which is kept running during this operation. The cut yields about 9 tons of dust, which is loaded in about 24 minutes. Next the conveyor is moved forward to a position about 1 ft. from the face. This operation requires about 1½ hours

Of the men who comprise the day shift, four work at the face and one works on the entry attending the conveyors and spotting the mine cars. The first job of the face men is that of snubbing the coal and loading what is loosened thereby onto the conveyor. This task is completed in 1 to 1½ hours. The appearance of the coal after snubbing is illustrated in the headpiece, and the face after the coal has been snubbed is shown in Fig. 2.

The snub cut is started from a point on the face 2 to 3 ft. above the floor and is slanted downward to the back of the kerf. It must be of such proportions as to accommodate the face conveyor, which is moved under it to a position shown in Fig. 6. The snubbing of this face is a simple operation, the roof pressure tending to loosen the coal along slips in the lower region of the cut. In fact the bar of the cutting machine sometimes is caught by the settlement of the roof. Snubbing, therefore, consists of little more than shoveling out that coal which lies below the most pronounced slips in the seam and which is released after the bugdust is loaded out.

Should the night men have difficulty in making their cut and therefore not find time to move the conveyor ahead to an advance position near the face, the day men leave the conveyor in the position shown in Fig. 2 while loading out the snub coal and afterward move it in one step from this position to that under the cut as shown in Fig. 6. In Fig. 4 are shown two daymen in the act of moving the conveyor forward and two other daymen drilling the coal.

The conveyor used on the face is the Jeffrey 44-B conveyor loader, and that laid to the entry is a 47-A portable conveyor, also of Jeffrey manufacture. The former is provided with hinged flights which turn up on end in the return run of the conveyor chain. This run is covered by hoods which in section are shaped like an inverted V. The conveyor bar is flexible so that any section may be made to assume a vertical or horizontal inclination with respect to an adjoining section.

Uneven Floor Is No Obstacle

This flexibility in a vertical plane allows the conveyor to adapt itself to an uneven floor and permits the free use of lifting jacks in raising a portion of the conveyor at a time over any offset in the floor which may have been made by the cutting machine. The flexibility of the conveyor in the horizontal plane, of course, enables one or two men to move segments of the conveyor forward progressively without disconnecting any part. Some of these details also are shown in Fig. 4. The drive head of the conveyor is moved forward by means of the feed chain of the cutting machine, which for this purpose is held rigid by a jack as indicated in Fig. 7.

By means of a rope which is drawn by a ratchet

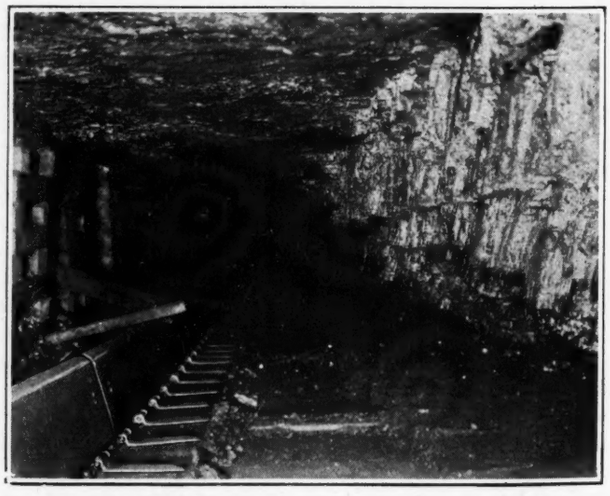


Fig. 2—Long Face After Face Has Been Snubbed

Before this snubbed face is shot, the conveyor is advanced to a position under the cut, after which the line of cribs is re-erected as close to the face as possible. Note the offsets in the floor due to the operation of the cutter.

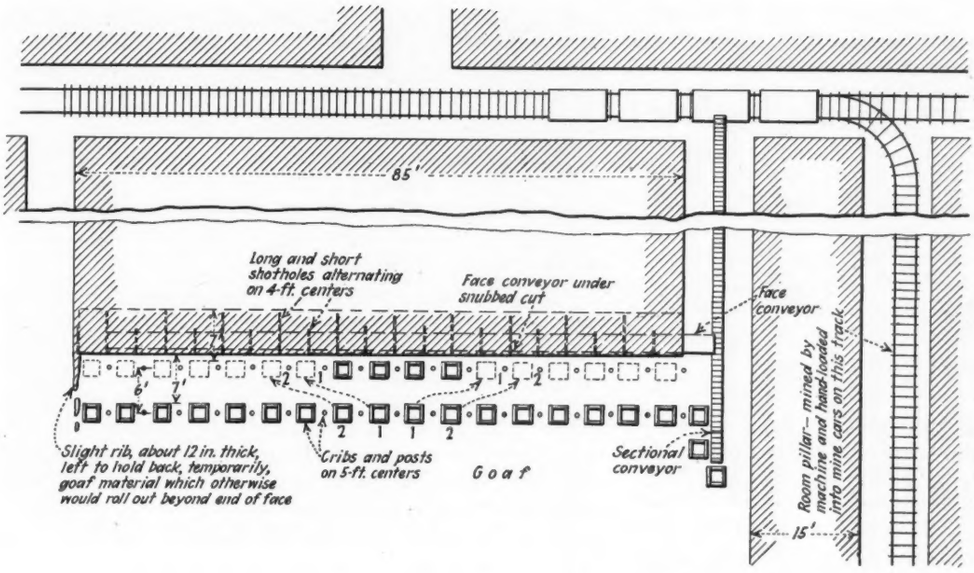


FIG. 3

Face Layout

The moving of cribs starts at the middle of the cut, where four cribs are erected near the face, after which those behind them are removed. This operation is extended to either side of these four cribs until the face limits are reached, only one crib at a time being erected, however.

device the segments of the conveyor are pulled progressively forward on skids. In Fig. 6 can be seen the end of a skid plate inserted under the conveyor and a block which when tightened by a ratchet winds up a wire rope attached to the front end of the skid. As the rope is wound the block and conveyor are drawn toward the front end of the skid, which is held in position by placing a small wedge of wood or a lump of coal under its rear end. Before the conveyor is moved it is lifted by a jack, so that the skids can be extended in front of it.

CONVEYOR IS LAID UNDER THE CUT

The conveyor is placed under the snub cut before the coal is shot chiefly because this arrangement allows the cribs to be moved to an advance position close to the face before the coal is shot. During the earlier work attempts were made to shoot the coal while the conveyor was still clear of the cut. When this was the practice the conveyor was gradually fed into the coal pile. This scheme did not give entire satisfaction at this mine. The steps in the bottom made by the cutting machine made it difficult to move the conveyor and the latter also tended to climb over, instead of working under, the smaller lumps of coal. Though these were all good reasons for moving the conveyor close to the face before shooting so that the coal could be shot down onto it they were none of them so important as the need to obtain space for the erection of cribs, thus shortening the time during which the span of insufficiently supported roof is allowed to stand. With the conveyor moved forward the cribs could be advanced before the coal was shot.

The shoveling of coal onto this conveyor is no great task, for the conveyor flights, and the pan under them, lie practically on the bottom. The face men in shoveling lift the coal but little. The kerf is easily cut; it saves explosive and produces more lumpy coal than could be obtained by solid shooting. At the same time it provides a means by which about one-third of the coal is shot onto and moved by the conveyor. What coal remains after shooting, again about one-third, is cleaned up in about 1 hour, including the time required for picking whatever coal, if any, has not been dislodged by the shots. Altogether, these men spend much less than half their time in actual shoveling and in that time is included the entire operation of snubbing, which, as has been stated, chiefly consists of removing with shovels any coal that the pressure of the roof has brought down.

As indicated in Fig. 3, the roof is supported by 30-in. square cribs set on 5-ft. centers in a single row and so located that they stand before the face is cut about 7 ft. clear of the solid coal. This distance is increased to about 13 ft. after the face is cut to a depth of 6 ft. The span of unsupported roof is maintained at 13 ft. only during the time required to prepare a cut for shooting. After the face is undercut, drilled and snubbed and the conveyor moved to an advance position under the cut, the cribs are moved to within 1 ft. of the face. Between adjacent cribs 6-in. round safety props are placed. These help to hold up the roof coal

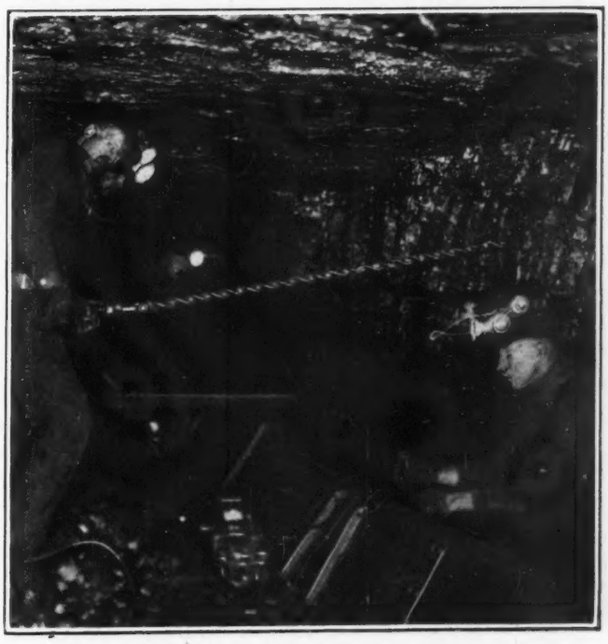


Fig. 4—Moving Conveyor and Drilling Face

Though the night shift of two men usually drill the shotholes, occasionally they are unable to do so, in which case two of the face men drill while the two other face men of the day shift move the conveyor as shown. The coal is drilled by electricity.

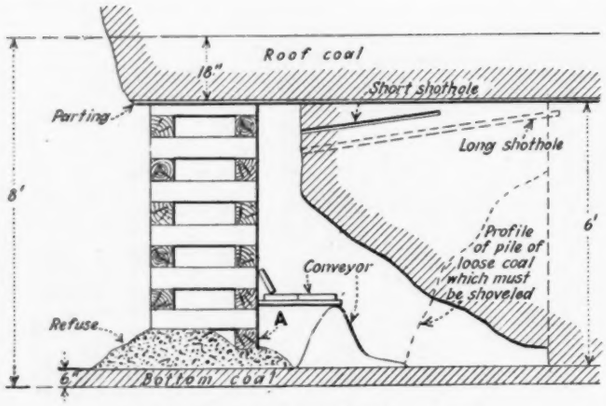


Fig. 5—Cross-Sectional View of Face

The locations of the conveyor, of the line of cribs prior to the shooting and of the shotholes are noted on the drawing. Boards resting on crosspieces between the hood of the conveyor and the cribs prevent coal from falling behind the conveyor when shooting.

and to hold back gob rock which otherwise would creep out between, and in front of, the cribs. They also facilitate the removal of the cribbing.

The crib line is advanced in stages—that is, before each crib is torn down another is erected between it and the face. Before the old line of cribs is dismantled a row of safety props on 5-ft. centers is set at a distance of about 27 in. from the face and between these are built the advance cribs. The re-building of cribs is started from the midpoint of the face and progresses toward the two ends. This job is accomplished by four men who work in pairs, one building and one tearing down cribs. As indicated in Fig. 3, four cribs are erected close to and in the middle of the face before the rear row is touched. Thereafter, crib after crib is torn down and re-erected in the sequence indicated in Fig. 3. By following this schedule the work is accomplished more speedily than it could be otherwise. The cribs are pulled down and re-erected in about 1½ hour.

They are built of 6x6x30-in. oak blocks on a bed of waste material and in the manner illustrated in Fig. 5. One man will build such a crib in about 9 minutes. By loosening with a shovel the refuse bed under the crib the trigger block *A* can be pulled out, after which the crib falls forward. The majority of the crib blocks are recovered, but when the safety props on either side do not support the roof sufficiently a few are lost. Occasionally the men find it expedient to set an extra post or two where the roof shows weakness, so as to enable them the more readily to recover the cribs. The safety props, of course, are not recovered. They crack and fall soon after the cribs on either side of them are removed, as shown in Fig. 9.

This company has found by actual experience that one row of cribs along the face is better than two. When two rows were used, more material and labor were involved and and the roof manifested a greater tendency to bend over the face and to bring an undue pressure on the coal. A single row of cribs, together with the top coal which is left, adequately holds the roof measures, and little or no gobbing of waste material is required. With each advance of one cut the laminated slates and coals in the roof are sheared over the rear ends of the cribs.

As already mentioned, the time chosen for putting in the drillholes depends entirely upon the condition of the face. When the face coal is more or less crushed the night men drill the coal before they cut it. When the face coal shows no signs of crushing, the night men cut the coal first. If, after the cut is cleaned out time yet remains, they also move the conveyor to within about 1 ft. of the face and lastly put in the drillholes. Otherwise they leave one or both these two duties to the day shift. It must be understood that the all-important job of the men on the night shift is that of cutting. Only occasionally do they meet with such difficulties as to preclude them from moving the conveyor or drilling the face.

In any event, whether the drilling is performed at

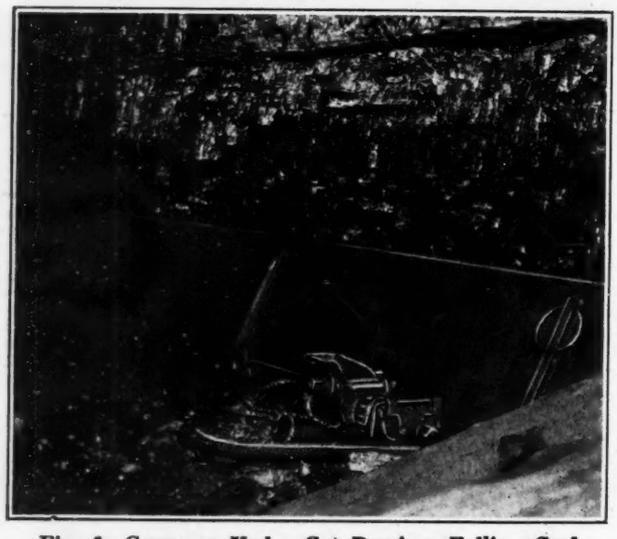


Fig. 6—Conveyor Under Cut Receives Falling Coal

The conveyor has hinged flights which turn up on end under the hood in the return run of the conveyor chain. The conveyor bar is flexible and is moved over skids through the agency of a wire rope wound on a ratchet device.

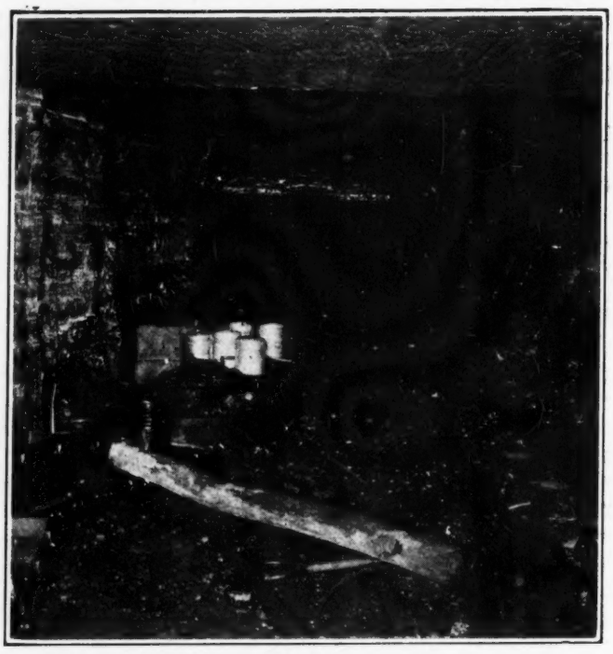


Fig. 7—Sectional Conveyor Into Which Coal Is Discharged by Face Conveyor

This sectional conveyor carries coal from the face to a trip of mine cars on the entry. When not in use the longwall cutter is stored clear of the face in the position shown on the left of the illustration. A pipe jack has been erected to hold the machine in place while its feed chain is being utilized to pull the drive section of the face conveyor toward the face.

Fig. 8—Shortening Sectional Conveyor

This man is engaged in shortening the sectional conveyor which carries coal from the face to mine cars on the entry. This is done as often as two cuts are completed. The end of this conveyor meanwhile extends as much as 12 ft. into the goaf and is protected by cribs as shown.

the beginning or at the end of the night shift or at the beginning of the day shift, the holes are spaced at intervals of 4 ft., alternately 2½ and 6 ft. long, being put in electrically by two drills of the aforesaid lengths. The short holes are started about 8 in. and the long holes about 14 in. from the roof, both being slanted upward so as barely to reach the roof coal, which, as has been stated, is not removed. Although the long holes are each drilled in about 1 minute and the short holes in about 30 seconds, the drilling cycle sometimes requires about 2 hours, most of which time is consumed in sharpening the drills.

Short Holes Shot with One Stick

The short holes are charged with one stick of permissible powder and the long with two. This is done by the conveyor attendant while the face men are moving the conveyor. The shots are fired by a battery, one at a time, beginning from the open end of the face. Of the coal brought down by each shot, that which falls onto the conveyor is transported away from the face before the following shot is fired. As illustrated in Fig. 5, boards are placed under each shot, supported by crosspieces between the cribs and the top of the conveyor hood, so as to catch any coal which otherwise would fall over the conveyor. What coal lodges on this cover is easily shoveled onto the conveyor before the boards are advanced to a position under the next shot. The coal that remains is pulled forward by picks onto the conveyor. There is still a little coal that has to be shoveled. As this coal is easily loaded by hand and requires practically no lifting, no attempt is made to feed the conveyor forward under it. Were this done, the conveyor would have to be moved back again inasmuch as a clearance of at least 30 in. between the conveyor and the face is required for the longwall cutter.

The management of the mine feels satisfied that it has succeeded in producing a major fall extending for a considerable distance above the seam. Other falls of large proportions have occurred at intervals. Whether these falls have penetrated a bed of limestone 30 to 40 ft. thick which lies about 150 ft. above the Pittsburgh seam, being worked, and between it and the Sewickley seam above it, is not definitely known, but it seems likely that this stratum has been broken.

Though the company has not yet demonstrated the merits of this system to its entire satisfaction, because it questions whether the roof has been properly controlled, yet the degree of success thus far attained demonstrates that the system is based on principles which give promise. Already four 85-ft. faces on as many pillars of that width have been drawn for a distance of 250 ft. without loss of equipment of a minable coal. At times the faces have shown signs of heavy pressure, but never such as would compel the abandonment of a place. In most cases the face has been under more or less weight, but in this system this is considered a help rather than a deterrent to mining, as the coal thereby is recovered with greater facility and with less labor and explosive.

The success thus far attained is due to the efforts made to keep the length of the unsupported span of roof in front of the face at a minimum. The aid which the roof coal lends the cribs in holding the roof immediately over the seam no doubt is of considerable importance. The removal or breaking of practically

Fig. 9—Safety Prop After Removal of Cribs

These props, which are of about 6-in. diameter, are erected between adjacent cribs. They hold the roof long enough for the men to remove the cribs, but collapse soon afterward. The one in the center, being behind the crib line, is about ready to collapse.

all supports in the goaf, whether of coal or of timber, assists the operation by allowing roof breaks to occur frequently. There is reason to expect that a layout of this kind, in which a new break must be established in every panel, will work at least as well as the present typical room-and-pillar layout and at the same time bring about such economies as will reduce the cost of mining. By increasing the retreating distance of the long faces in a panel or by working simultaneously two or more adjoining panels, a longface layout similar to that described should hold greater possibilities than layouts of rooms and pillars, at least in the thinner seams.

I wish to acknowledge the assistance rendered me by Stephen Arkwright, general manager, and Wallace Dartnell, mining engineer, of the Connellsville By-Product Coal Co. in the preparation of this article.

Adapting Loading Machines To Mine Conditions

Cars of Three-Ton Capacity or Over Should Be Supplied—More Cars Are Needed Because Locomotives and Loaders Do Not Co-ordinate

By Edward Bottomley

General Superintendent, Sheridan-Wyoming Coal Co., Sheridan, Wyo.

OF THE MANY TYPES of loaders now on the market several are proving successful in mining districts suited to their operation. Some of these five or six years ago seemed to be miserable failures from every standpoint, mechanically and otherwise. If it had been my misfortune to have used, or tried to use, one of these at that time, I should do it a great injustice if I were to discuss its shortcomings in that experimental stage. It would be just as unfair as to condemn the present-day automobile because we had experienced trouble in the operation of the same make of machine ten or twelve years ago.

Some loading machines will do good work in almost any seam of coal that is reasonably level, if the bed is 6 ft. or more thick, with a good roof and hard floor, or if the seam is pitching not over 5 or 6 per cent. But almost all the loading machines that have been built are only able to give good results where conditions are favorable. Because of the great variations in mining conditions, many different types of mechanical loaders will be needed. A machine that will do its work well in a bed 8 to 12 ft. will be of no use in one 5 or 6 ft. thick. A machine that will work in a level bed, or one having a pitch not exceeding 5 or 6 per cent, will be useless if the bed pitches 15 to 18 deg.

Most of the machines thus far built are too heavy, too bulky, too expensive, and they require too much room. Unless there is an unusually hard floor, these heavy machines will bury themselves in the clay unless sufficient bottom coal is left to provide a solid floor. This cannot always be done.

WILL NOT RUN WITHOUT FORETHOUGHT

Many operators think that all that is necessary is to buy loading machines, to pay for them and send them into the mine. Nothing could be further from the fact. Much preparatory work is required. If the mine cars do not hold 3 tons of coal or more, without chunking, the cars must be enlarged, if possible, to hold this weight when loaded with the machine, for the cars are merely rounded up and will hold no more than could be thrown on with a shovel without chunking. If the cars cannot have their capacity increased, then it is best to buy entire new bodies.

In panel entries, where one or two machines are operated, a parting that will hold not less than twenty-five cars should be made. This, of course, depends on many local factors, such as the size of the pit cars, the length of the panels and the number of rooms that are worked on a panel, etc. It is not advisable and hardly possible to work more than two machines in one panel entry, regardless of its length. It is well to concentrate machine work to a certain extent, but there is a limit to this and one can go too far with concentration.

Brief abstract of paper read before the Rocky Mountain Coal Mining Institute, at Denver, Colo.

When machines are loading coal they load fast, and if there are too many in one district, the coal cannot be taken away from them.

After the type of loading machine best suited for a mine has been decided, it must not be forgotten for a moment, that, no matter how much expenditure is put into a loader, no machine is a substitute for intelligence any more than intelligence is a substitute for a machine. A higher degree of intelligence is required to make a success of a mechanically operated mine, than of one which is operated by hand. Skilled men are not only required to operate the machine itself, but each man of the crew must be skilled in his particular part of the work and be ever ready and on the alert to do his part at the right time.

Shooting the coal for mechanical loading calls for the best skill available. Coal, like that in northern Wyoming, is difficult to shoot, if a fair percentage of lump is to be obtained and if at the same time the coal is to be brought down in good condition for machine loading. We found it necessary to drill twice as many holes in a room as were needed for hand loading.

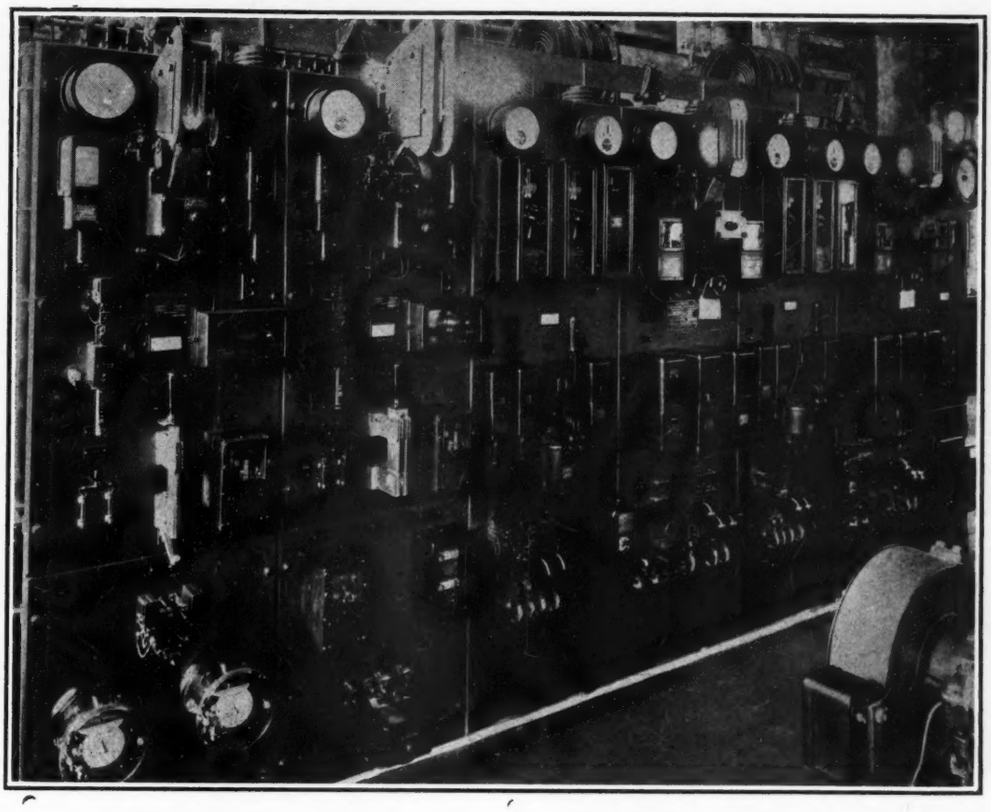
MORE HOLES AND SLOWER POWDER

After some experimenting, we also found we could get better results by using a slower grade of powder and by drilling eight holes in a room, not using any more powder than when four holes were used to shoot a room for hand loading. With such shooting methods the coal as shot down is of more uniform size. The lumps are not too large for machines to handle and the coal is not badly shattered in the immediate vicinity of the shots as when fewer holes and larger quantities of powder are used in each hole. To expedite this work, all hand drills have been replaced with the electric drills, each crew having one.

As the work in a mechanically operated mine is naturally more concentrated than in a mine with hand loading, the haulage system sometimes, especially in a large and well extended mine, has to be entirely revised. More standing cars on the partings are required than for hand work, because when the machine is loading, it loads fast, and more cars must be provided to keep it supplied until the place in which the machine is working is cleaned up. With a good supply of standing cars on the partings, a machine is insured of steady loading when the loading is good, and the haulage locomotive is also insured of having trips at scheduled intervals.

PARTING CORRECTS LACK OF CO-ORDINATION

To illustrate this more clearly, if two loading machines are working in one entry, which is usually the custom at the Sheridan-Wyoming mines, the haulage locomotive that serves this section, will haul a trip of, say, twenty-five cars. It visits this parting every hour. Thus it will haul 200 cars daily, which is a maximum day's loading for both machines. When the machines are working under good conditions, they will each load at the rate of 20 cars an hour, and sometimes more. It is easy to see that without extra cars on the parting, when a machine was loading to full capacity, it would be compelled frequently to wait for cars. On the other hand, when the machines stop loading to move from room to room or are delayed from other causes, which occur frequently, the haulage locomotive will not have its 25-car trip when it makes its regular call.



Pennsylvania Co. Puts Ten Substations And Five Fans Under Automatic Control, Making Striking Advances in Practice

Special Protective Features Added to Standard Equipment— Single-Phase Operation Slows Fan Instead of Stopping It— Large Savings and Protection Are Afforded by Automatic Control

By F. Fraser Williams
Power Department, Pennsylvania Coal & Coke Corporation, Cresson, Pa.

TO STREET-RAILWAY COMPANIES we owe the introduction of automatic substations. As soon, however, as this class of equipment had proved reliable, coal-mining companies became interested. Most of the mine installations have been made only when new substation units were needed to provide for the advance of the mine workings. There have been, however, a number of scattered instances in which existing hand-controlled units have been converted to full-automatic, but comparatively few cases of companies changing practically all their substations at one time.

The Pennsylvania Coal & Coke Corporation recently replaced the ordinary control with the full-automatic type in seven of their substations. These convert the 2,300-volt alternating-current purchased power into the 275-volt direct current used in the mines. This installation presents several new and interesting features.

Probably no one mining company has as much fully automatic controlled equipment as will be found at these mines. The switchboards are of two different makes, and each type has been supplemented by special equipment to provide more complete protection or to decrease the operating cost.

SUBSTATIONS IN MOSS CREEK DIVISION

In the three substations of the Moss Creek division the type of control installed is as shown in the headpiece of this article which illustrates the automatic control and metering equipment of a station which is set in operation by a push button and which contains two 150-kw. motor-generator sets. The panel at the

Headpiece shows the new control board in the Moss Creek substation. This handles two 150-kw. synchronous motor-generator sets and the metering and distribution to a neighboring substation. The two relays which balance the load between machines and which are standard with this make of equipment are to be seen in the lower section of the second panel from the left. Although the motor-generator sets in this substation had to be moved 50 ft., the change was made in 36 hours.

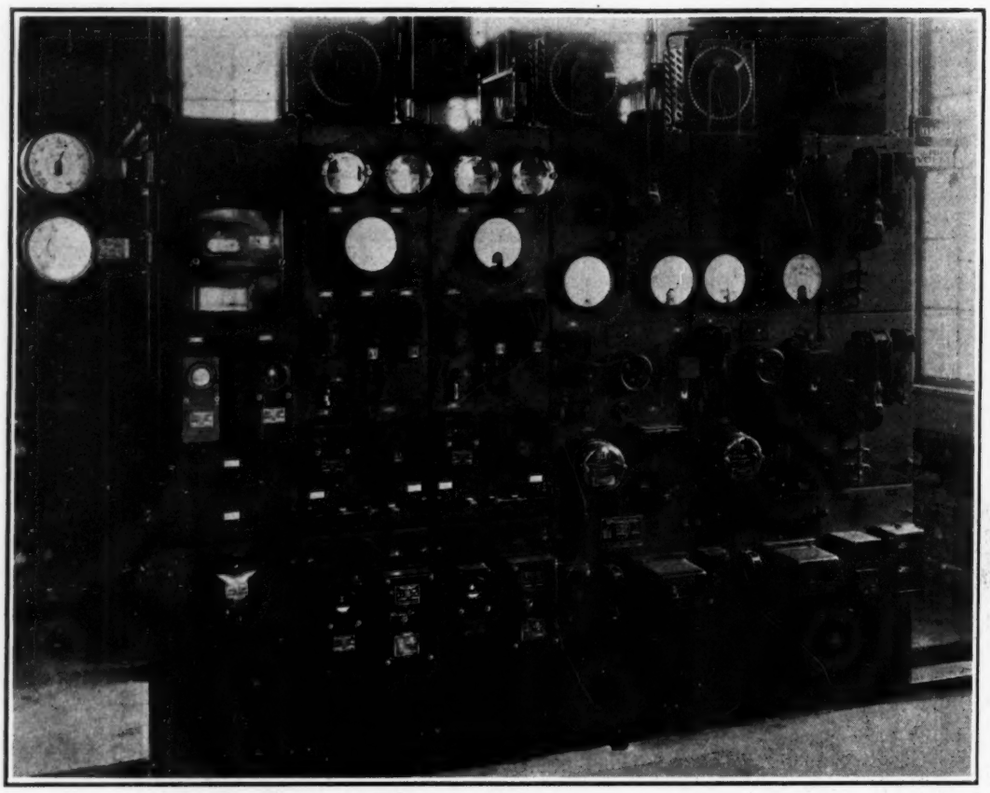


FIG. 1

Two-Unit Board, Arcadia Substation

One reason for the trim and neat appearance of this board is that the starting panels with their heavy contactors were placed in this instance to the rear of the main board (see Fig. 4). The local balance relays, which are not standard for this make of automatic two-unit control, are on the lowest section of the panel on the extreme right. A general view of this substation with its motor-generator sets is shown in Fig. 5.

extreme right controls, through a motor-driven oil switch, the 2,300-volt line feeding one of the other substations.

The substation so fed has its control set for continuous operation, so that it starts up whenever this oil switch is closed. The watthour and demand meters on this panel register the total power used by the installation. The two direct-current meters on the lower part of the panel at the left end of the board register the distribution of power by the two feeders which carry the current furnished by the two 150-kw. sets. Other meters handle the house service and other outside power distribution. Thus an accurate account is kept of the purposes to which the power is applied.

Though the standard protective devices are unusually complete in this control, it was still possible that the machines might overheat if operated single-phase. The thermal relays and the open-phase relay, it is true, tend to prevent this. The open-phase relay is of the voltage type, which, though it prevents any attempt to start in single-phase, will not operate if a phase should open while the machine is running, for the reason that generator action will produce a nearly constant three-phase voltage at the board.

LINE CURRENT 1¾ TIMES THAT IN COILS

Through current transformers the thermal relays are connected in the line and therefore these relays must be set to operate on the line current which is 1.732 times the current in the motor coils. Thus, if one phase should be opened while the load was of such value and constant enough that the line current of the motor did not exceed the value for which the overload relays were set but did exceed 58 per cent of this, the motor could dangerously overheat without any protective device coming into action.

The obvious remedy for this would have been to install a current phase-balance relay but, after due consideration, it was decided to use type C.T. temperature relays with this make of control. These relays which provide protection against overheating from any cause whatsoever, will be described as a part of the fan-motor control. They may be used, however, to protect any electrical apparatus on which a search coil can be placed.

The two feeder panels used in this installation are to be seen at the left of the headpiece of this article. They are of a standard type, designed so as to prevent the breaker closing on excessive overload. They are planned for either stub-end or multiple-feed service and are arranged so that an overload on the machine will drop out one feeder rather than open the machine breaker itself.

As this is an important substation, the work of changing over was speeded up so that it was accomplished in 36 hours. This also included moving the two motor-generator sets a distance of 50 ft. to their new positions.

In all of these installations everything possible is done before starting to make the change so that the power supply to the mine will be interrupted as little as possible. To begin with, the switchboards are, of course, set up and connected together in a suitable place. Bearing thermostats are installed on idle days or Sundays, and in one case the motor and generator field rheostats were moved to their new locations before the actual change was made. All this saves much time in changing over and in two unit stations, can be done, without any interruption, as one machine can usually be shut down in idle hours.

TAP TRANSFORMERS AHEAD OF SWITCHES

In all our installations the operating-control transformers are tapped ahead of the disconnecting switches of the machine. This permits making a thorough se-

quence test of the apparatus without the annoyance and danger which might be caused either by starting the machine with each test or by opening the machine leads to prevent starting.

The type of operating equipment used for motor-generator set control at the Arcadia and Ehrenfeld mines is that shown in Figs. 1 and 2, and in the four panels at the left in Fig. 3. At Arcadia the starting panels with their oil switches were installed at the rear of the main board. These are shown in Fig. 4. This arrangement allows the other panels to be aligned in a neater and more satisfactory manner, as indicated by Fig. 1. A general view of the substation is given in Fig. 5. At Ehrenfeld sufficient space was lacking to place the panels in this manner, so the starting panel was placed in line with the others. Disconnecting switches are provided for each machine. In addition to the standard instrument equipment, an alternating-current voltmeter and field ammeters are installed at each place.

Full Protection Against Single Phase

This make of control, for single unit substations, gives full protection against single-phase operation. It includes both a voltage relay, which prevents any attempt to start with single or reverse phase, and also a current phase-balance relay which shuts down the station if a phase opens during operation and which locks out if the open circuit should occur between the machine and the line or in the machine itself. The only special features are overspeed protection and an arrangement whereby the motor field is connected to a discharge resistance while starting. This portion of the equipment is not standard with the maker for this class of control.

In Fig. 3 a combined recording-demand and watt-hour meter is to be seen on the third panel from the left and below it are the time controls, one of which starts and stops the motor-generator and the other controls the fan speed. The clock is arranged so as to shut the set down on Saturday evening as is usual at the end of each day but to delay the starting of it until Monday morning. Also. the clock setting can be changed to leave the station idle on any other day if desired. In the two-unit substations the time control is connected in series with the emergency starting relay, thus allowing the second machine to be set for action at a given time.

This make of equipment, as stated before, is entirely satisfactory in our single-unit sets but did not provide in the most economical manner for paralleling two machines. The general operating scheme in two-unit stations is for one machine to run during the idle hours and the other to come on when the load demands it. However, after starting, the shunt field will take some time to rise to its operating temperature, and the two machines will not divide the load correctly until this temperaure is reached.

To obviate this difficulty, the manufacturer of this equipment allows current to flow through the shunt field of the idle machine when only one unit is running. It is, of course, obvious that this consumes energy and therefore some loss. To prevent this the same type of paralleling equipment was installed here as at Moss Creek. The two relays which do the work can be seen mounted at the top of the lower panel next to the glass-covered meters, shown in the headpiece, and on the lower sections of the right-hand panels shown in Figs. 1 and 2. These relays are so arranged that if one machine takes more than its share of the load a portion of the shunt-field rheostat of the other machine is short-circuited causing it to pick up load until an equal division is attained.

Fans Are Automatically Controlled

In addition to the motor-generator sets there are, at five of the substations, mine ventilating fans which had to be automatically controlled if these substations were

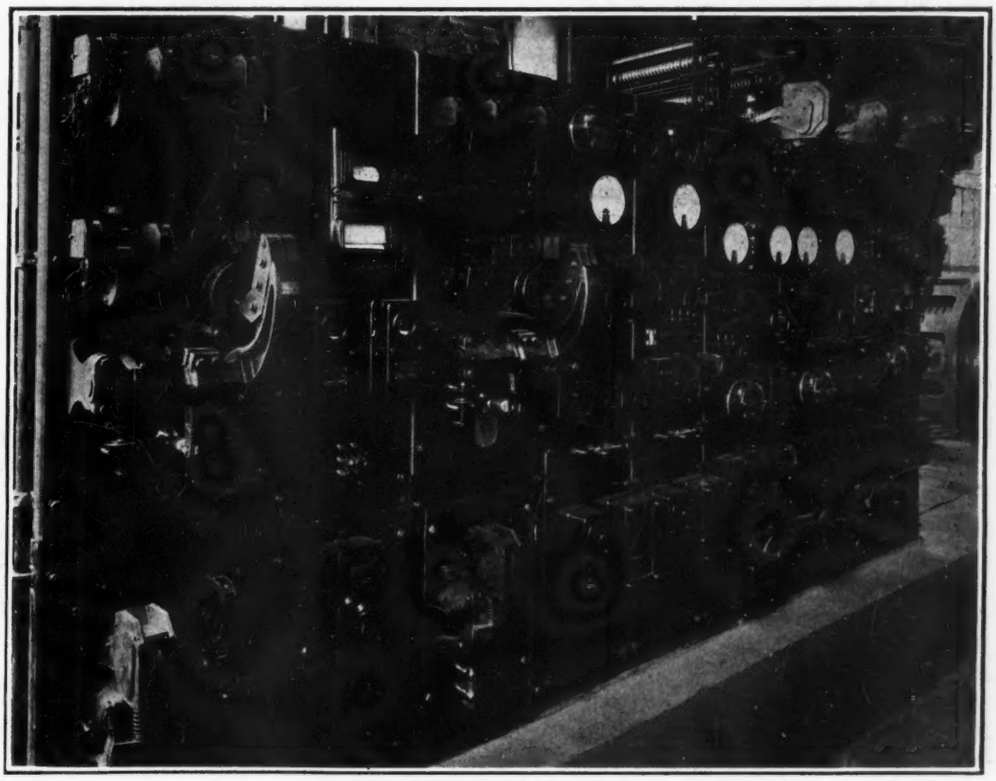


FIG. 2

Two-Unit Board, Ehrenfeld No. 4 Substation

Here, due to lack of floor space the starting panels had to be placed in line with the main board. The time control which regulates the starting and stopping of the substation units is mounted at the bottom on the second panel from the left. In addition to the standard instrument equipment, the boards are fitted with ammeters in the synchronous field circuits. As in the illustration of the Arcadia substation, the local balance relays are on the lowest section of the panel on the extreme right.

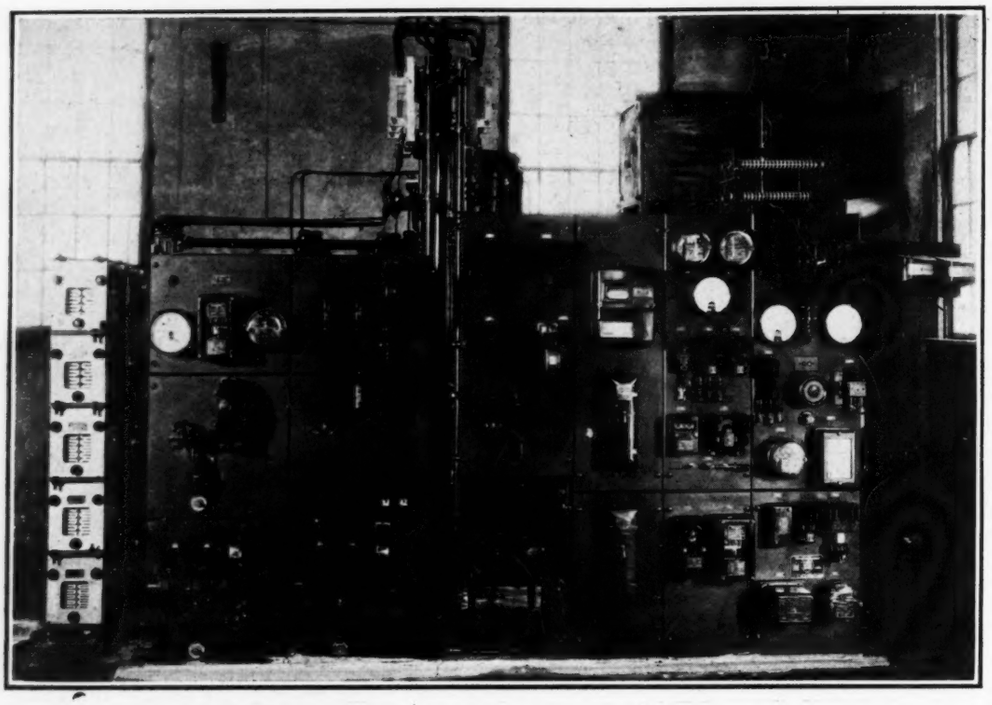


FIG. 3

Control for Fan and Motor-Generator, Ehrenfeld No. 1 Substation

The resistance and the two panels at the left belong to the fan, and the rest of the board to the substation unit. The fan motor is a 100-hp. unit and the motor-generator has a capacity of 300 kw. A contactor provides for the slowing of the fan to a point 42 per cent below the capacity of the motor regularly by a time control during idle periods and occasionally in emergencies by a relay in case the line "goes single-phase."

to operate without attendants. A typical automatic control board for these fans is shown at the left in Fig. 3. The resistance and the two 3-section panels belong to this equipment.

This controller differs in several ways from any that previously have been installed on mine fans in this country. It insures complete protection while providing the extreme in continuity of service. The motor starts by push-button or time control, resistance being cut out in the usual manner until the rotor is short-circuited and the motor attains full speed. During idle hours the time control causes resistance to be cut into the rotor circuit making the motor run at reduced speed. As the fan load varies approximately as the cube of the speed the power saving is large. The usual bearing, low-voltage, and overload protection is provided, and in addition the phase-balance relay, shown in the center of Fig. 6, is also connected in the motor circuit.

This latter, however, does not shut down the motor if a phase should open during operation. Instead it causes a resistance to be inserted in the rotor circuit sufficient to cause the speed to decrease to 70 per cent of normal. This drop in speed will reduce the load to a value less than the 58 per cent which a three-phase motor should safely carry when operating single-phase. The motor is allowed to continue at this speed unless it becomes overheated, in which case the type C. T. relay shown at the right in Fig. 6 stops the motor and locks it off the circuit.

RELAY BASED ON WHEATSTONE BRIDGE

This type of relay, which is an interesting application of the principle of the Wheatstone bridge, was developed by the Westinghouse Electric & Manufacturing Co. as an indicating instrument but the electrical engineer of the Pennsylvania Coal & Coke Corporation, J. F. MacWilliams, was able to induce that company to develop it as a protective relay, the work being done with the assistance of W. J. Brennen of the Westinghouse company. Two search coils composed of wire having a high-temperature coefficient of resistance are wound around the motor stator and leads brought out as shown in Fig. 7. These coils are connected with two fixed resistances mounted in the relay case, in the same manner as the resistances of a Wheatstone bridge.

The actuating current is furnished by two current transformers connected in the motor lines, the secondaries of which are paralleled so that current will flow

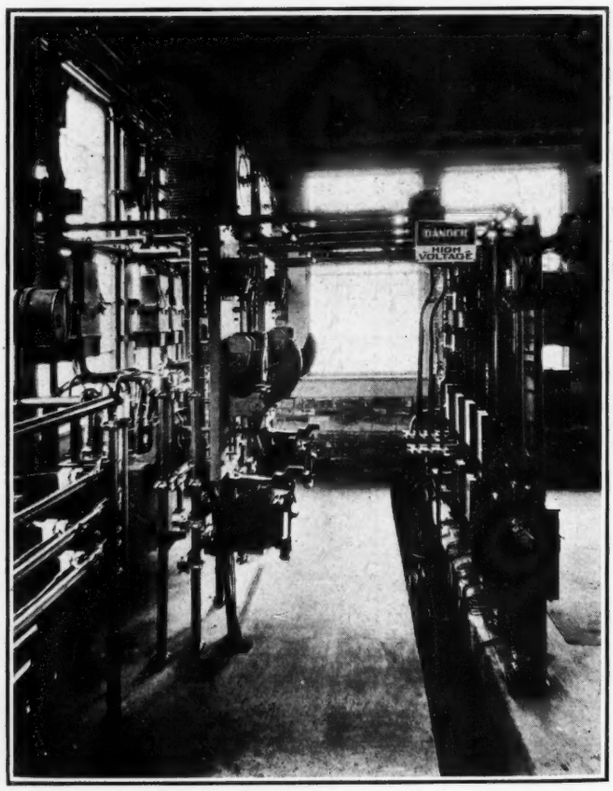


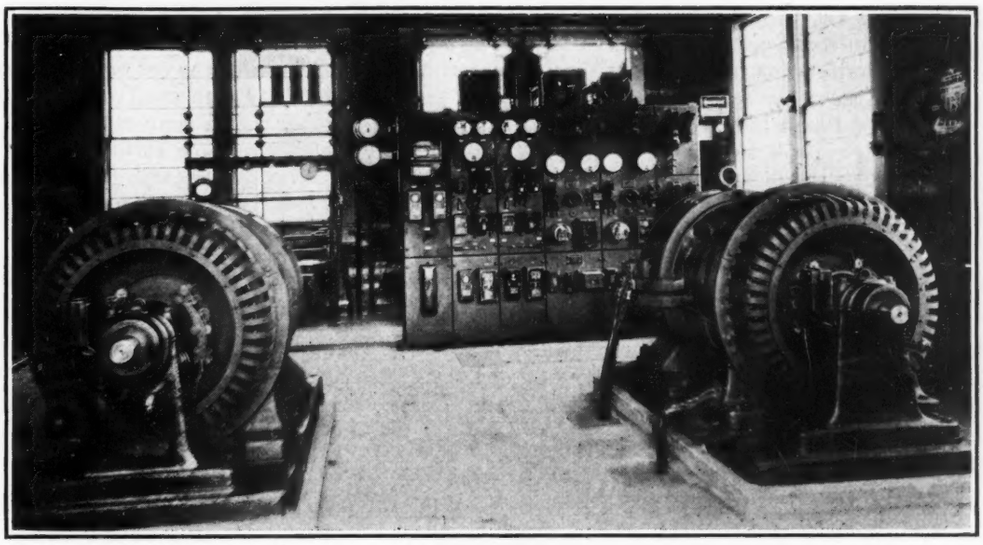
Fig. 4—Back of Main Board, Arcadia Substation

The starting panels are about midway between the board and walls. The auto-transformers are mounted on the wall almost above the oil switches. Wiring installation cost is greater in old buildings because ducts have to be cut in the floors and sometimes through foundations.

FIG. 5

Arcadia Substation

When making a change from manual to automatic control everything possible was done before the switch-over, in order to reduce the period of shutdown. Even the field rheostats were moved to their new locations beforehand. Ventilation of the motor-generator sets is by means of ducts from the outside to the centers of the machine foundations.



regardless of what motor phase is opened. The relay coil is connected across the resistances just as is the galvanometer of a Wheatstone bridge. As the resistance of the search coils increases rapidly with temperature, current will be forced through the relay coil should the motor become overheated. Increased load will cause more current to flow from the transformers and, proportionally, through the relay, its closing being dependent on both current and temperature, thus affording complete protection.

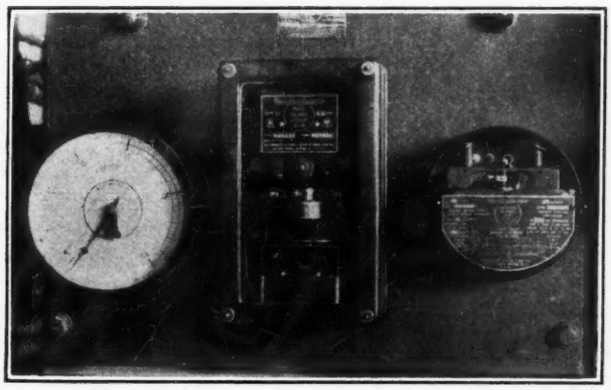


Fig. 6—Protective Relays, Fan Control Panels

The current-balance relay in the center will cause a contactor of the board to insert resistance in the motor circuit in case of an open circuit in one wire of the three-phase line. The type C.T. temperature overload relay, with the cover off to show the contact, is at the right. These fan installations represent a new application of the relay.

The problem of proper ventilation of automatic substations is one which, in many installations, seems to have received little attention. Where there is no attendant, windows or doors cannot be left open to cool the building. In these substations a ventilating duct is built through the floor from the machine foundation to the outside. This duct is slanted at an angle which prevents the entrance or accumulation of moisture. A ventilator in the roof allows the heated air to escape.

Equipment such as this affords a large saving, much of which cannot be shown in dollars and cents. The intangible advantages are: The absolute protection of the apparatus controlled, the greatest possible assurance of continuity of service, and a dependability which enables one at all times to predict with certainty the action of the equipment.

The money saved by automatic installations depends, of course, to some extent on local conditions, but is dependent chiefly on the number of operatives which the new equipment releases for other work. The cost of new equipment, for changing a single-unit substation to automatic control is about $4,000, and for a two-unit plant, $9,000. In order to find the investment represented by the change the erection cost must be added. This installation cost is about $750 for the single unit and twice this where two-unit equipment is installed, but this expenditure will, of course, vary greatly.

A lower cost would naturally be found in a new installation where no trenches or ducts have to be cut for the wires and where a suitable place could be easily prepared for the switchboard. As many of the older substation buildings are limited in size, it often requires much labor to set up a new board in a suitable place, old foundations and other obstructions frequently having to be removed or cut through for the wiring.

DRILLING FOR BEARING THERMOSTATS

The installation of the bearing thermostats causes a further variation in costs. In new machines the babbitt is usually made of a depth sufficient that the thermostats can be enabled to enter by a hole drilled in the babbitt and some even have the hole already provided, but in many of the older bearings it was found that the hole came partly in babbitt and partly in the iron outer section. This, of course, makes it almost

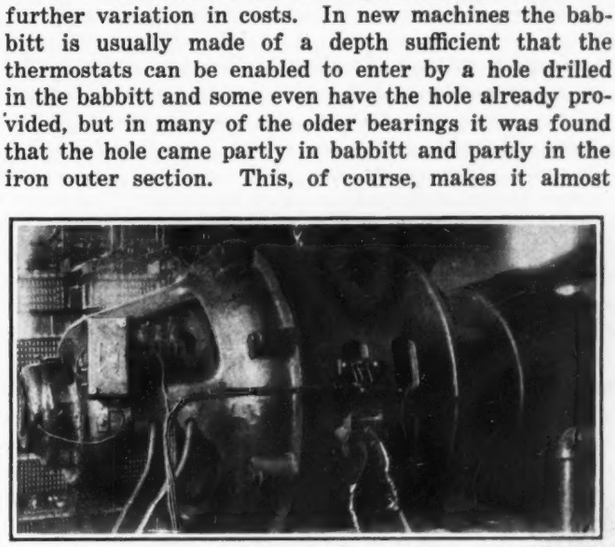


Fig. 7—100-Hp. Fan Motor, Ehrenfeld No. 1 Substation

Above the main terminal block is the 4-wire connection leading to the search coils which have been added to the motor in connection with the type C.T. relay. The search-coil group is wrapped around the outside of the stator coil ends, close to the end of the lamination. At the left end is a bearing-temperature relay.

impossible to drill the holes with the ordinary drill press, so in some cases it was necessary to cut a groove of the required depth and size with a shaper and then rebabbitt the upper section.

We have found that the cost of maintenance, including weekly inspection and cleaning is about $250 monthly, for which sum twelve substations can be maintained, as one man should inspect two each day. In normal operation the use of automatic control does not make necessary any replacements that would not have to be made before its introduction. Brushes, breaker contacts, and so on would have to be renewed at least as often with manual operation. There is, of course, a charge for power taken by the relay coils, but this is small and is more than offset by the added reliability.

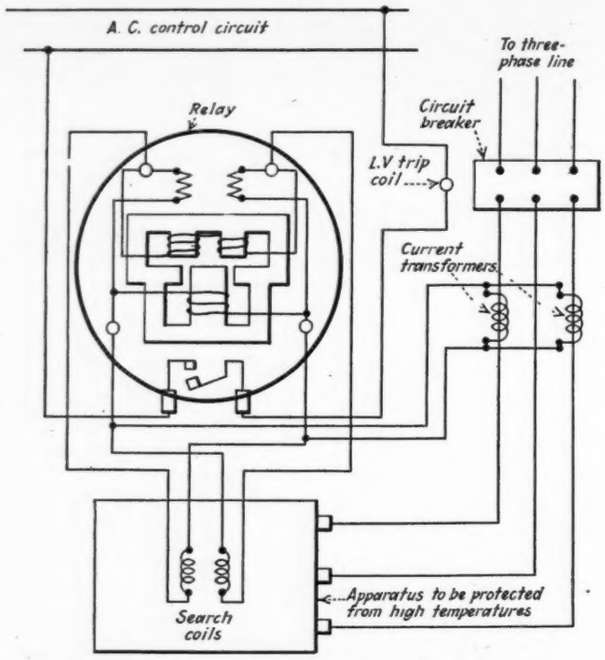


Fig. 8—Connections of Temperature Relay

The relay itself operates on the principle of the Wheatstone bridge. Its power supply comes from current transformers in the motor leads. By using two transformers in parallel the relay is not rendered inoperative if the line "goes single-phase."

To give an approximation of the total savings made by automatic operation, we will consider an installation of six single-unit stations and six of the double-unit type. These, as previously stated, can be cared for by one man. For fewer stations the savings would be in proportion, for the maintenance and weekly inspections would then require only part of one man's time. The total investment for the twelve stations considered would be about $91,500. The annual interest and depreciation on this sum at 12 per cent is $10,980 and the maintenance cost $3,000. Thus the total yearly charge against the automatic operation is $13,980.

The saving to be made is directly dependent on the number of operatives released. In this locality mine-substation operatives are paid approximately $150 per month. At this rate, if only one operative was released per substation by the automatic control, the net saving would be $7,620 per year or $635 per substation. At continuous operations where three shifts are required, the yearly saving becomes $50,720 or $4,220 per substation, because the cost of automatic operation is practically the same whether the plant runs continuously or only part of the time. There seems no question therefore but what a great saving may be made by converting manual substations to automatic.

Even in the case of a manual substation which is attended by an employee who spends most of his time at other work, conversion to automatic control may show an appreciable saving. In such cases, however, the saving is rather intangible but may be found in increased production per man and per unit of equipment. Even though it may not be proposed to convert any given manual station to full-automatic, it may be profitable to introduce several of the protective features of such stations because they furnish many valuable advantages and can be applied at small cost.

Main and By Products Exchange Places In Business of Coke Production

First ammonia was the sweetener of the byproduct coke-oven industry; now it is gas. Will toluol come next? A drug on the market after the war, it shows today renewed activity not as the basis of an explosive to propel shells but as a means of making paint.

J. D. Forrest, vice-president of the By-Products Coal Corporation, of Chicago, addressing the local section of the American Institute of Mining and Metallurgical Engineers at Charleston, showed how changed conditions since 1913 had caused rapid shifts in byproduct oven practice, making what were formerly considered main products change places with what at one time had been regarded as a byproduct. The first byproduct ovens were built chiefly to obtain ammonia, but now the chief product is gas. At one time it was not uncommon for one-half of the gas to be wasted, and that which was sold brought only 10c. per thousand cubic feet. Now little gas is wasted, and the plant must get 20c. or more for it in order to continue in operation.

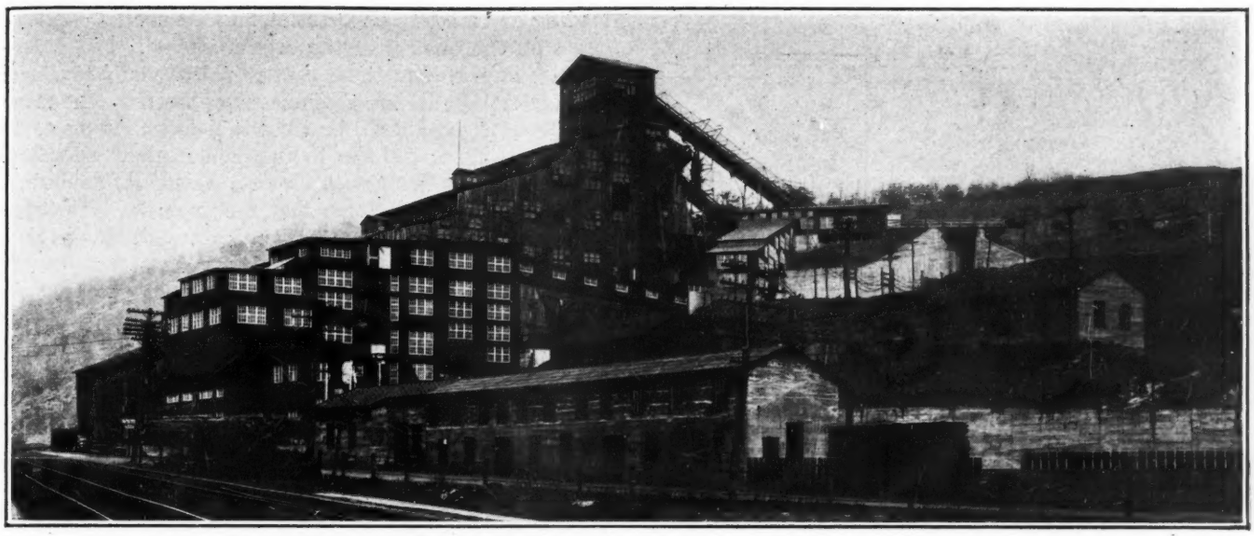
COAL IS DOMESTIC-COKE BAROMETER

Before the war $1 per ton paid the operating and maintenance costs of carbonizing coal, but under present conditions the costs are $2 or more. The sale of coke usually pays for the coal; therefore the byproduct operator is not greatly concerned as to its cost. He is, however, troubled by its price fluctuations. He would not object to the coal operators getting together to stabilize the price, even if he had to pay a little more.

Mr. Forrest explained that the rapid and certain demise of the scattered merchant furnaces of the country is due to the fact that they have no byproduct ovens. It would not pay them to build ovens because they have no city or steel mill to serve as an outlet for the gas. Usually a byproduct plant must be situated so that it can sell the coke within a radius of 150 miles.

Toluol, one of the byproducts of a coke plant, recently jumped in price from nothing to 10c. and up to 50c. per gallon, because of its extensive use in the new lacquers such as "duco" which many of the paint companies are now marketing. The use of these lacquers promises to extend materially in the next few years. Exterior paint of houses is likely to furnish a new field for toluol.

As to the quality of the coals adapted to byproduct coking, Mr. Forrest said that, broadly speaking, the higher the thermal value of the coal, the lower the percentage of ash, oxygen and moisture. For making cupola coke, the higher the fusing point the better, but for furnace coke the opposite statement is true.



Preparing Coal for Sale in a Finical Market

Alloys Lengthen Screen Life—Lime Saves Exposed Metal from Corrosion—Some Devices Economize Water—Others Improve Quality of Coal—Shaking Telegraph Prevents Degradation

By Frank H. Kneeland
Associate Editor, *Coal Age*
New York City

PERHAPS never before in its history has the coal industry as a whole been confronted with a sterner necessity for preparing the best quality of fuel that it is commercially possible to produce. The reasons for this are not far to seek, for the industry is face to face with the fiercest kind of competition both from within and without.

During the recent strike in the hard-coal region a large proportion of the country's population that heretofore had relied almost exclusively upon anthracite for domestic fuel learned the use of substitutes—coke, oil and smokeless coal. These people will not now blithely revert to hard coal unless both its quality and price are reasonable. In order to recover their natural but invaded markets, therefore, it behooves the anthracite producers to look more carefully than ever before to their preparation. For the public is in no mood to tolerate any unnecessary ash.

In the soft-coal fields the conditions are not greatly dissimilar. With mines overdeveloped in comparison to the country's needs, with three-fourths of the nation's bituminous production coming from non-union fields, with protective freight rates that no longer protect, and with inter-field and inter-operation competition of the keenest kind prevailing, the way of the bituminous producer is indeed hard. He who even hopes to survive must needs look well to the quality of his product, and be sure that when he offers coal for sale it is indeed coal and nothing else.

Many producers have already discerned and heeded the handwriting on the wall. Others have not yet seen fit to change their preparation equipment in any way, believing doubtless, and in many instances probably not without good reason, that their methods of preparation and final products are well above the average of their fields. As a rule, however, most mining companies are not satisfied with "things as they are" but are striving for the best attainable.

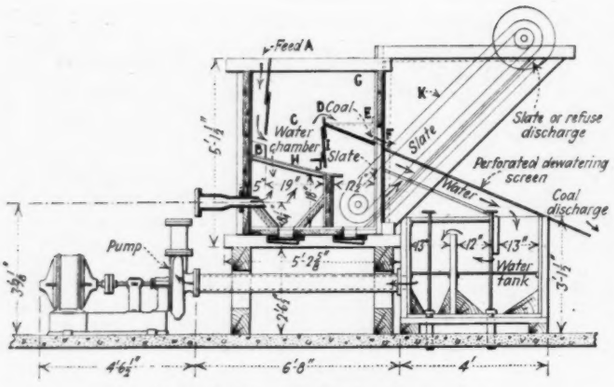
Radical changes in methods or equipment seldom come at once but usually are the product of a growth that is more or less slow. This is the case at present. Although some new machines and devices have recently made their appearance, most progress is being made through a wider adoption and utilization of machines and equipment already available. In not a few of these, however, recent improvements have done much to render them applicable to present needs and more effective than ever before.

Improvements in Screen Materials

One of the first processes through which coal is passed after being brought from the mine, in most cases, is that of sizing over shaker screens. Although in the anthracite region the type of shaker employed has undergone little alteration in many years, the material of which the screen plates or jackets are composed has changed and is still changing. When the shaker supplanted the revolving screen the first jackets were of ordinary blue annealed-iron or steel plate. Because of the highly corrosive action of the water used these were soon destroyed.

The next step was to substitute bronze jackets, which gave a much longer life as the result of their immunity from acid attack. Because of the comparative softness of this metal, however, it was susceptible to the abrasive action of the material handled. Monel metal was introduced to overcome this difficulty, being harder than bronze and at least equally resistant to acid action.

The headpiece accompanying this article shows the new plant of the St. Clair Coal Co., near Pottsville, Pa. The new breaker may be seen in the foreground with the old breaker behind it. Note the difference in the relative sizes of the two structures. The new installation gives a better preparation than could be attained with the older one and does it more cheaply.



Vertical Section of Hydro-Separator

The floor space occupied by this machine has been reduced by placing the tank under the elevator. Feed enters the machine at *A* and passes through the gate *B* into the chamber *C*, where the rising current of water from the screen *H* buoys the coal up over the dam *D* and into the space *E*, from which it escapes through the gate *F* to the dewatering screen and thence passes by chute to the pocket. Meanwhile the slate and rock collects on the unperforated portion of the screen *J*, passes through the adjustable gate *I* and settles into the conveyor *K* by which it is removed from the machine. The action is gentle and continuous and degradation is negligible.

Many copper alloys later made their appearance and were successively employed for this purpose. Possibly the material most recently used for this purpose is what is generally known as "stainless steel" or, what is practically the same thing, "rustless iron." This in reality is merely an alloy of iron and chromium, or a high chromium steel. It is a comparatively hard metal and consequently resists abrasion well. Its acid-resisting qualities equal those of bronze and its tensile strength is slightly greater than that of steel. These desirable qualities render it possible to make jackets of this material from two to four gages thinner than bronze or iron plates intended for the same purpose. This not only decreases the cost but affords a better preparation.

High-chromium steel when used in screen jackets becomes polished under the action of the coal treated. When the recent strike was called and the breakers and washeries ceased operation it was a source of some solicitude on the part of coal operators as to how these jackets would stand the long shutdown. When work was resumed after months of idleness it was found that these jackets were covered with a thin gray powdery deposit that could be easily rubbed off, leaving the plate with almost as high a polish as when the shutdown started. After coal had been run for an hour or so these plates were in practically the same condition as when the shakers stopped operation at the beginning of the strike.

HAS HIGH SCRAP VALUE WHEN DISCARDED

Like bronze this material possesses a substantial scrap value when a jacket has become so worn that it is no longer fitted for screening coal. Taking its first cost, length of life and all other things such as labor, scrap value, etc., into consideration, it is estimated that on the average the standard jacket—37½ x 69½ in.—shows a saving of nearly $5 over bronze and nearly $3.50 over ordinary blue annealed steel. These are savings that are well worth considering.

We turn now to a consideration of preparation treatment proper. In its broadest sense preparation includes not only mining but all subsequent operations through which the coal is passed on its way to the railroad car or other vehicle of shipment. For the plan of operation, method of undercutting, snubbing, shearing, shooting, loading and mine transportation all have their inevitable effect on the quality of the coal marketed. Not infrequently improved methods that would result in material savings or benefits are strenuously opposed by the mine workers. Sometimes this opposition is so strong as to greatly delay, impede or even preclude their adoption.

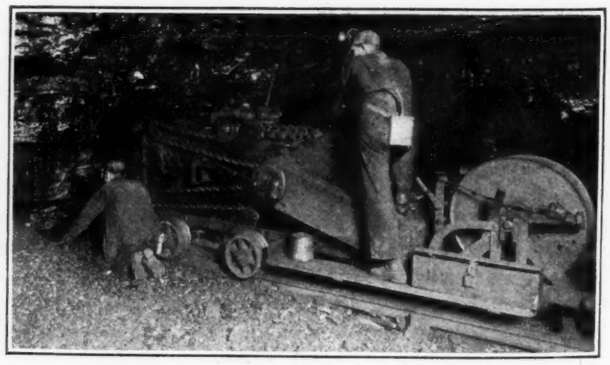
In the bituminous region center shearing, snubbing, improved methods of charging the explosive, including air cushioning, and conveyor loading are all being tried. In some beds, such as the Illinois No. 6 measure, center shearing in conjunction with careful methods of shooting have yielded highly encouraging results or some that would amply justify the adoption of these practices.

Conveyor loading also is exerting its influence upon the quality of the mine product. Where a long face is continuously undercut throughout its entire length it naturally takes less explosive to bring it down than if the coal were produced from several short faces, with their inevitable tight ends. Long-face coal is thus broken up less than that produced from short faces. Shoveling or rolling the coal into low conveyors also breaks it less than shoveling it into a car which stands much higher above the bottom, although this is offset to some extent by the drop given the coal at the loading point.

MINE LARGE LUMPS AND LOAD THEM

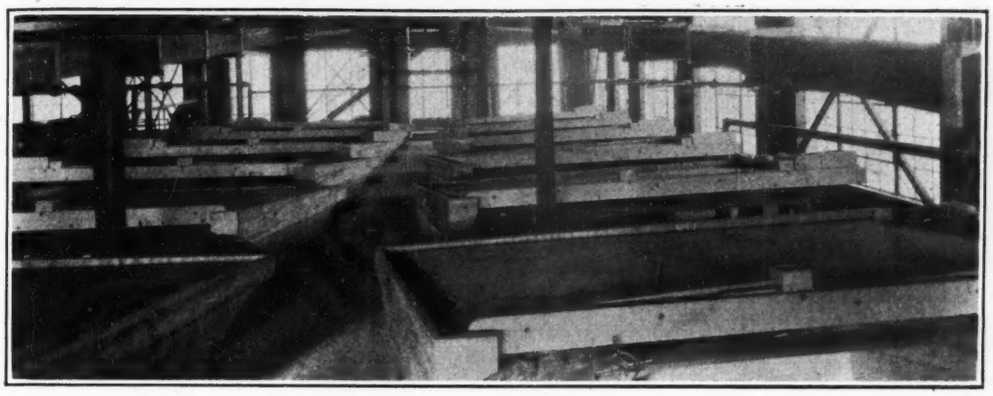
At least two combined mining-and-loading machines, where used, are said to produce bituminous coal of large size. These are the McKinlay and the O'Toole machines. The McKinlay machine cuts circular kerfs in the coal face into which wedging rollers are forced, breaking the coal out in chunks. By the O'Toole machine the entire face is undercut continuously and the coal brought down by the action of the roof assisted, if necessary, by light "pop shots." By this means even the friable Pocahontas coal comes down in slabs so large that they have to be broken with picks before the conveyor will move and load them. Both of these machines appear to be giving excellent results in coal production. The McKinlay machine seems to be particularly adapted to entry driving; the O'Toole machine to the robbing of wide, long pillars.

Although not exactly new in point of years, several Miller shaking screens have been installed and used in the West Virginia field during the past few months. The details and action of this device were described by A. F. Brosky in *Coal Age* of Feb. 23, 1922; Vol. 21,



Center Shearing in Illinois Reduces Breakage

This particular coal face is located in the No. 6 bed of Southern Illinois. By dropping the cutter bar onto the bottom of the cut just before it is finished a slab of coal may be broken out upon either side of the shear, thus producing an appreciable snubbing effect. Center shearing, at least in some places, gives a loose end that reduces the quantity of explosive that is necessary to bring down the coal.



Concentrating Tables

Table room of modern breaker in anthracite field. Here buckwheat, rice and barley are separated from their impurities. The twelve tables can treat 300 to 350 tons of fine material per 8-hr. shift.

page 324. A screen of this type has been in use for several months in one of the tipples of the Lake Superior Coal Co., near Welch, W. Va. It is 6 ft. wide and about 45 ft. long. This screen is supported independently of the tipple and actuated from an inclosed driving head which is belt-driven from a 20-hp. motor located on the ground. The head, which is totally inclosed and lubricated by a splash system, is mounted on springboards or wooden columns which are rigidly attached at both top and bottom. The screen proper is supported by A-frames built up of structural shapes and hinged at either extremity. The entire screen is thus free to oscillate back and forth, being restrained only by the spring of the posts supporting the driving head.

Oscillatory motion is obtained by the whirling of unbalanced weights in the driving head. This oscillation is differential in character; that is, it is a slow forward movement and a quick return, its amplitude when operating at full speed being about 6 in. One peculiarity of this type of screen is the fact that the amplitude of vibration is greatest during starting and stopping; that is, when the driving head is revolving at less than normal speed.

This screen is used both for sizing the coal and as a picking table. One of its noticeable characteristics when in operation is the fact that there is no appreciable retrograde movement of the coal, the material upon it appearing to move forward with the screen and then to stand stationary as the screen is jerked backward beneath it. The power consumption of this screen is extremely small. Starting from rest with the screen fully loaded takes no more power than starting with the screen empty. Both of these statements may appear almost preposterous at first blush, but it should be remembered that the energy required to drive this machine is consumed in whirling weights in vertical planes. Only a small quantity is lost in friction, and the whirling weights shake the screen.

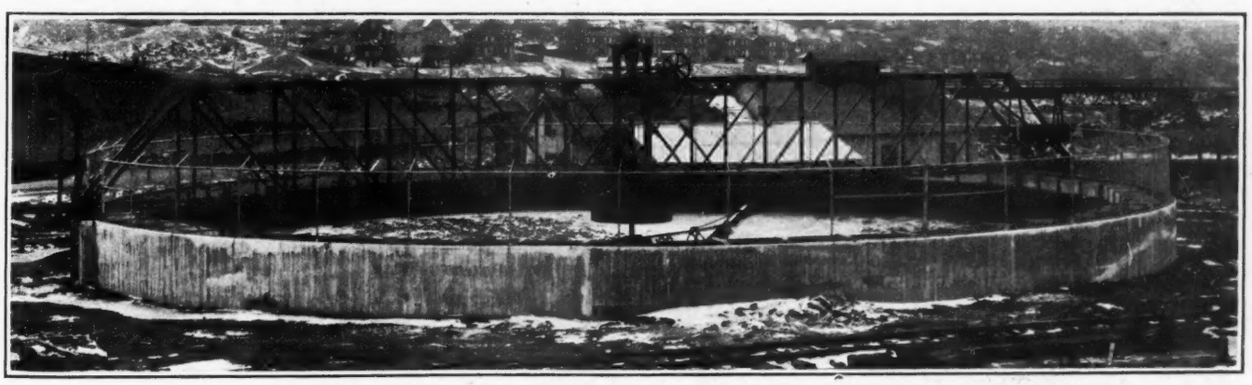
In preparation proper much advance has been made in the recent past. This has not been so much in the development of new methods and appliances as in a further adoption and utilization of those already in use. A Menzie hydro-separator of an improved design (see accompanying drawing) has been installed in the breaker of the East Boston Coal Co., at Kingston, Pa. Commercial tests show that it has a large capacity, much larger than its size would indicate. It is now used in cleaning pea coal coming to this breaker from several different sources and which consequently has a greatly varying specific gravity, which naturally renders it hard to clean. The feed to this washer is irregular, sometimes running as high as 40 tons per hour.

Little Impurity in Pea Coal

Inspection of the top of a carload of pea that has been treated in this machine reveals only here and there a piece of slate or rock. This machine's diminutive size, however, as well as the small quantity of power that it consumes and its low cost are strongly in its favor.

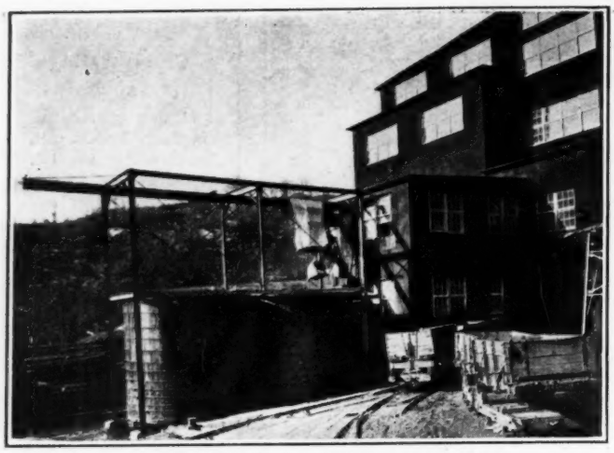
Few pieces of equipment introduced into this country for cleaning coal have attracted wider attention than the Rheolaveur coal washer. This device, which was described in *Coal Age* of Dec. 6, 1923, and Mar. 27, 1924, reached this country from Belgium. It has been successfully employed in Europe for some years.

One of the larger anthracite companies has been ex-



Big Thickener Clarifies 4,000 Gal. of Breaker Slush per Minute; Water Is Available for Re-Use

This 100-ft. thickener has a natural clay bottom. The makeup water is treated with hydrated lime before it is delivered to this tank, and the overflow is re-used in the breaker. Neutralizing the acid does much to preserve the spray and other water lines and to decrease general upkeep. The cost of the water treatment is many times returned by the longer life of the equipment.



Part of Silt-Recovery Plant at St. Clair

In the modern breaker as in a packing house everything is utilized. In the present-day anthracite preparator even the fine material, down to 65-mesh or less is reclaimed. If this silt cannot be utilized immediately it is carefully stored for use at some future date

perimenting with the "Rheo" for some time, and the results obtained are said to have been highly satisfactory. This method of washing entails the installation of an entire process requiring the building or rehabilitation of a whole breaker or washery or a substantial portion thereof. One large anthracite company is now installing equipment of this kind to treat 3,000 tons per shift. This will form the first half of a 6,000-ton unit which will completely rejuvenate a breaker built only a comparatively few years ago and which has always been considered modern in all particulars. Another big anthracite producer is building a plant of similar eventual capacity and is doing it in the same way—namely, a half at a time. Seven other installations of this equipment, ranging in capacity from 1,000 to 1,600 tons of coal per shift, are either being made or are in immediate prospect. One of these is for the American Smelting & Refining Co., at Cokedale, Colo.

TREATS SIZES FROM 3½ IN. TO 48-MESH

This process treats all sizes of coal from 3½ in. down to 48-mesh on the same machine and in a single operation. This is an important advantage, particularly with bituminous coal. Between 4 and 5 tons of water is employed to treat one ton of mine product. That is, about 2½ gallons per minute is in circulation per ton of daily output. The makeup water needed will be from 5 to 10 per cent of the water in circulation. Thus the treatment of 1,000 tons per day will require a makeup of from 150 to 200 gallons per minute.

For treating the smaller sizes of coal, tables, classifiers and thickeners are receiving extensive application. Thus one new installation of this kind consists of a Dorr bowl classifier which recovers coal down to 65-mesh, two Deister-Overstrom tables that clean the No. 4 buckwheat down to an ash content of about 16 per cent, a Dorr classifier that dewaters the washed coal and a small Symplex classifier that dewaters the refuse, also a 64-ft. thickener to clarify all waste water from the breaker with the exception of that from the lip screens and track drainage. This machine handles about 2,100 gallons of water per minute and overflows 1,900 to 2,000 gallons per minute.

In this installation makeup water from the mine amounting to about 500 gallons per minute is delivered to a 30,000-gallon tank at the foot of the breaker into which the overflow from the thickener is also introduced. Slaked lime is added to the 500 gallons per minute of makeup water at the rate of about 200 lb. per hour. This is at the rate of slightly over 1/10 oz. of lime per gallon of makeup. The lime neutralizes the acidity of the water going to the breaker and renders it acid free. The expense involved is about $10 per day for lime, but whereas with untreated water the spray lines in the breaker lasted only about a week, with the treated water they last indefinitely. Purifying and using the mine water also obviated the installation of a pumping station on the bank of a creek 2,000 ft. away as well as an expensive pipe line connecting it with the breaker.

EIGHTEEN CONCENTRATING TABLES

Another recent installation of equipment for treating the smaller sizes embodies eighteen concentrating tables treating the buckwheat Nos. 1, 2 and 3 with two classifiers dewatering the slate from these machines. A thickener in this plant 24 ft. in diameter recovers the No. 4 buckwheat down to 65-mesh. This product is raised to the top of the breaker and cleaned on seven tables. The washed coal is then dewatered in 6 model C-20 classifiers and the slate in two machines of similar type.

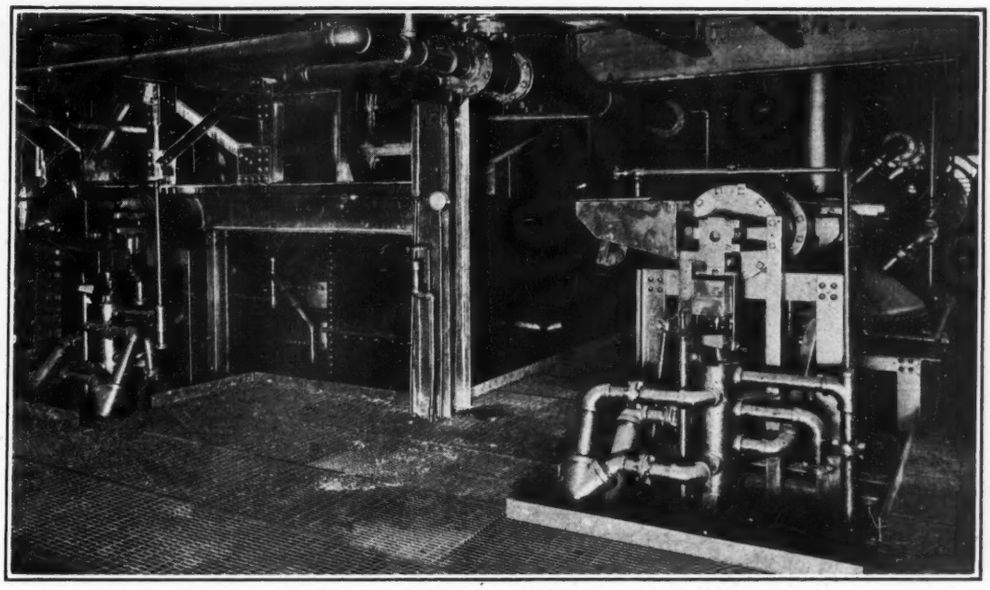
All waste water from this plant goes to a 100-ft. thickener being treated on its way with lime to neu-

Flotation Breaker

This breaker has been built around the Chance process of coal flotation. Naturally it differs radically both in construction and appearance from the older types of anthracite coal preparators. This building well exemplifies the simple straight lines and the stability of construction to which modern processes of preparation are particularly conducive. Steel concrete and glass are freely employed.

Refuse Removal

Equipment for removing slate and refuse from flotation cones in Chance breaker. Many think of a breaker or tipple as a dark, dingy sort of place where dust, dirt and grime are everywhere and eternally present. But note the absence of dirt in this picture.



tralize its acidity. This installation is designed to handle 4,000 gallons of water per minute. About 900 gallons per minute escapes with the sludge which will be used for slushing underground workings.

Particularly in the southern anthracite field where the coal measures are badly distorted, the proportion of fine sizes has always been large and their treatment in the past has been a problem. Modern means and methods, however, are here doing much to alleviate the former difficulties. The St. Clair Coal Co. operating in this field near Pottsville has recently constructed a new breaker utilizing the Chance flotation process of coal preparation. The new breaker is much smaller than the old one which it replaces, and the results obtained are suggestive of what may be expected in other installations.

Naturally some mechanical difficulties have been experienced in this plant as the mechanism employed requires a manipulation wholly at variance with that accorded the former equipment. Ridding the final product of the sand used in the flotation mixture has always been considered one of the difficulties to be anticipated with this method of preparation. After the men became familiar with the process, however, no trouble has been experienced from this source. Thus barley now leaves this breaker with only from 14 to 15 per cent of inert content and the silt carries only 18 to 19 per cent of ash.

Somewhat of an innovation in anthracite preparation has been adopted at this plant in that the small sizes are briquetted. The briquets thus made are guaranteed to contain not more than 15 per cent of ash. The inherent ash of the coal mined at this plant will average about 9 per cent.

Three Flotation Cones

Three flotation cones are installed in this breaker. The first treats coal of buckwheat and smaller size; the second takes the product of the mine of pea and larger size and the third retreats the reject from the other two after it has been crushed down slightly. The reject material from the second cone is first screened into chestnut and smaller and into stove and larger, these two products passing to separate rolls. The stove and larger is crushed to chestnut and smaller and the other size is reduced to pea and smaller. These products are then combined and passed through the third cone.

In this third cone the liquid is maintained at as high a specific gravity as possible, that is, between 1.7 and 1.75. In the other cones the smaller sizes are treated with a liquid of 1.6 to 1.65 sp. gr. and the larger sizes with a liquid of 1.65 to 1.7 sp. gr. Refuse from the No. 3 cone ordinarily is sent to a waste bank, but if the quality of this material is deemed to be unsatisfactory it is again crushed and retreated.

At this operation mining is being conducted in three beds, namely, the Buck Mountain, Skidmore and Mammoth. Some coal comes from strippings in worked-out areas and as a result contains much rock. The effectiveness of the preparation process employed, however, may be judged from the rock-and-bone content of the final products. Frequent tests on the coal as loaded for shipment show the following results: Egg, slate 1 per cent, bone, 2½ per cent; stove, slate 1½ to 2 per cent, bone 3 to 3½ per cent; nut, slate 3 per cent, bone 3 to 3½ per cent; pea, slate 4½ to 5 per cent, bone less than 5 per cent. Buckwheat, rice and barely run less than 15 per cent in ash and the silt under 20 per cent. All sizes except the silt are briquetted and the briquets sold under guarantee as to ash content, as has been stated.

Low Percentage of Coal Goes to Bank

The proportion of coal going to the refuse bank at this plant will average 4 or 5 per cent. This figure, however, includes all sizes. The proportion of the larger or domestic grades is, of course, slight, most of the coal thus rejected being the small sizes. The silt at present is pumped to a dam from which it will eventually be reclaimed.

Fine coal is brought to the briquetting plant from storage and passed first through driers, after which it is crushed in hammer mills, mixed with the binder and passed through the presses. The briquets are then baked in an oven in a temperature that gradually increases from 300 to 600 deg. F. After leaving the oven they are passed through a cooler before being deposited in the shipping bin. The capacity of this briquetting plant is approximately 450 tons per 24-hour day. A force of twenty-six men is employed—ten on the day shift and eight on each of the other two.

Egg Coal Eased Into Pocket with Negligible Degradation with Parish Shaking Telegraph

These pictures show telegraph lowering coal into a pocket that is nearly empty and one that is almost full. When the coal has built up around the sides of the curved plate extending across the top of the pocket the material already deposited forms a trough through which the incoming coal flows until it slides off the sides of the plate. The coal may thus slide or it may roll, but it can never fall more than a few inches. In this way degradation is greatly lessened.

Preparation in a true sense does not end at the discharge of the jig or the cone or other washing appliance. In order to assure delivery of the best possible product to the consumer the cleaned and sized coal must be deposited within the pocket and transferred thence to the car with a minimum of degradation. A recent invention for easing prepared sizes into the pocket with a minimum of breakage is what is known as the Parrish shaking telegraph, taking its name from its inventor, A. L. Parrish, superintendent of construction for the Kingston Coal Co., Kingston, Pa.

This device has been installed at the No. 2 colliery of this company at Edwardsville, Pa., and is shown in two of the accompanying illustrations. It consists of a trough or telegraph, slightly inclined, suspended by spring boards or other means and oscillated longitudinally by means of an eccentric in a manner exactly similar to that employed for shaking a screen. The inclination given this trough or chute is slight or far below the critical angle of coal on steel, so that the material moves only by virtue of the oscillation of the trough.

At the edge of the pocket the sides of the trough disappear and the bottom, which extends on entirely or almost entirely across the bin is humped or gabled in the middle. As shown in the illustration, also, it is provided with corrugations or riffles to assist in moving the coal forward. It is somewhat questionable, however, if these are really needed.

Suppose that the bin or pocket is empty. Coal from the jigs or other preparation equipment passes down the conveying portion of this telegraph by a series of short glides or slides. When the edge of the pocket, and consequently the delivery portion of the telegraph, is reached the coal promptly slides off on either side, drops a few inches to the slanting floor of the pocket down which it rolls or slides until it comes to rest at the bottom. Gradually the coal piles up until the delivery section of the telegraph is reached. The coal now builds up along the edges of the telegraph forming a channel the sides of which are loose coal and the bottom of which is the shaking gabled plate.

Coal coming to the pocket will not leave the delivery section of the telegraph until the edge of the pile in the pocket is reached. In other words the coal sides of the channel already referred to are effective in restraining the side movement of the material traveling on the plate and the incoming coal does not, therefore, leave the plate until the edge of the pile is reached. By this means the coal can slide or it can roll either along the bottom of the chute, the bottom of the pocket or down the sides of the pile, but it cannot fall more than a few inches. It thus reaches the gate or chute delivering to the car with far less degradation than if it were spouted or telegraphed into the pocket in the ordinary manner.

And now for a short look into the future. The trend toward better preparation is the logical outcome of economic conditions—the consumer wants clean coal and if it is not forthcoming he is inclined to turn to other fuels. The movement to supply this need has just gotten fairly under way. Barring some unusual contingency, not discernible at the present time, it can hardly stop in its present status. The future, therefore, should witness more efficient and cheaper methods of mining, better and cheaper preparation and less degradation in the processes of handling and delivery to the common carrier. The consuming public, also, should receive a product capable of satisfying all reasonable exactions as to quality.

Should We Neutralize Mine Waters?

"That neutralization of acid mine waters will require an expenditure of large sums of money, but that it does not seem to be prohibitive in most cases to treat these wastes in order to overcome in a large measure present objection to their entrance into streams," is the conclusion of R. D. Leitch, assistant chemical engineer, U. S. Bureau of Mines, Pittsburgh, Pa. "Whether" he adds "this will be an economically sound policy will depend upon the collection of more definite data than is available at present.

Except to satisfy aesthetic demands, there is no reason for spending more money and effort annually to purify natural waters than the damage caused in losses and difficulties experienced by users of water so polluted. The question is, or should be, to decide how much pure waters are worth from all possible viewpoints and then to determine the cost of purification in the same manner. If the one is cheaper than the other, common sense will demand the more favorable." "G. S. Rice has suggested," he asserts, "that the use of limestone for rock dusting to prevent coal-dust explosions will also have a considerable effect on neutralizing acid waters within the mine, and this seems to be a logical conclusion."

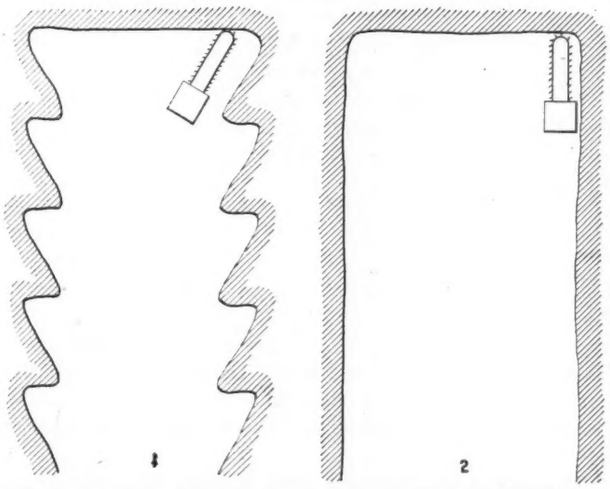
Quantity of Explosive Employed One Factor Only Of a Number in Successful Blasting

Rib Gouging to Be Avoided—Kerf Should Be Clean—Shearing Affords Additional Free Face—Resistance to the Explosive Should Be Made Equal in All Directions

By C. W. Nelson
Explosives Engineer, Hillman Coal & Coke Co., Pittsburgh, Pa.

THOSE who would blast coal successfully must recognize from the start that the problem involves a multitude of factors, neglect of any one of which may spell failure even though the others be properly performed. Different beds, and even the same measure, in different localities, may not possess the same characteristics. These peculiarities of seam or locality must be studied by the explosives engineer or blasting expert as special problems. Only those considerations that are more or less common to all coal mines regardless of the characteristics of the particular bed will be considered in this article.

The first operation that has a direct bearing upon



Figs. 1 and 2—Incorrect and Correct Way of Sumping

Serrated ribs are a sign of incorrect sumping. Whatever may be the position of the machine when cutting is begun, the sumping cut should be made in a direction parallel to the line of sights. This will assure a straight rib and avoid a wedging action in blasting. Fig. 1 shows a badly cut face and Fig. 2 one that is properly cut.

blasting efficiency, of course, is the cutting of the coal, whether this be undercutting, topcutting, shearing, or a combination of the last with either of the first two. If the coal is undercut, the side of the kerf should be parallel to the line of sights of the entry or room. One of the most common faults found where the coal is undercut is the practice of gouging the ribs. This is caused by the machine runners failing to square the machine with the sight line before sumping in, thus allowing the cutter bar to gouge or cut into the pillar beyond the normal rib line. Fig. 1 shows a working place in which the ribs have been gouged. It also shows how the machine is improperly placed for the sumping operation. Fig. 2 shows correct practice in these respects.

This gouging of the ribs has two bad effects on subsequent mining. First, it tends to throw the place off the sights and causes it to be mined beyond its normal width. Second, it encourages the drill runners or miners, unless they are closely supervised, to drill shotholes parallel to the edge of the undercut. When the ribs within the limit of a cut are gouged to any extent and the shotholes are drilled parallel to the sides of the undercut, the inside end of the drillholes lie outside of the normal rib lines of the room as shown in Fig. 3.

Pocketing the Shot by Rib Offsets

The dot-and-dash lines *AA* and *A'A'* represent the normal ribs of the advancing place and the dotted lines show the edge of the cut to be blasted. That portion of the hole from *X* to *Y* lies beyond or outside the normal rib line *AA*. Under the circumstances practically the entire explosive charge placed in this hole will be located between *X* and *Y*. When this is detonated the force of the explosion will exert its energy in three general directions—downward and in the directions indicated by the arrows *B* and *C*.

With the hole placed as shown in Fig. 3, that component of the force indicated by *C* will act against a solid block of coal and consequently will cause more or less shearing along the edge of the undercut from *E* to *D*. Moreover, because a wedging action is set up, the explosive charge will not loosen the coal nor allow it to move forward. Consequently the major force of the explosive will act toward the undercut and along the general direction shown by arrow *B*, causing the coal to be shattered at the back of the cut and "set down" on the undercut, without allowing it to be lifted toward the front.

Such a shot shatters the coal badly at the back of the cut and fractures it but little at the front. Under these conditions, the miner must do much digging to loosen the coal for loading. He thus produces an undue percentage of small sizes. The practice of gouging by machine, therefore, should not be tolerated for it is entirely unnecessary.

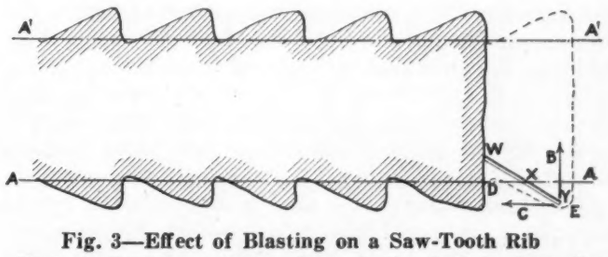


Fig. 3—Effect of Blasting on a Saw-Tooth Rib

Most or all of the explosive charge in the shothole shown lies within or behind the normal rib line. Detonation of such a charge not only results in much shattering of the coal but wedges the material to be brought down between the new face and the sloping rib. Such a shot signally fails to produce the best possible results.

Fig. 4—A Shot Productive of Large Lumpy Coal

This place may not appear to have been shot but it has. The illustration shows a tight shot in the Pittsburgh bed. Note how the coal has separated from the roof and also the shearing cracks along the right-hand rib. These are what the miners call powder cracks. A vertical channel will be dug along this rib toward the back of the cut which will permit slabs of the coal to separate at the face cleats and to fall forward with little or no inducement from the miner's pick.

The use of a shearing machine without some type of horizontal cutter, of course, is not regarded favorably. Shearing should supplement undercutting or top-cutting if a large quantity of lump coal is desired. The advisability of shearing in conjunction with horizontal cutting is purely a matter of dollars and cents, and resolves itself into the question: Will the increased percentage of lump coal realized from this process warrant the purchase of the necessary machine and the additional cost of cutting? This question can be answered only after the natural conditions prevailing in any locality and the differential between the market price of lump and of run-of-mine coals have been given due consideration. The additional free face which shearing provides undoubtedly renders blasting much less difficult.

TOPCUTTERS SAVE ROOF BUT NOT COAL

Topcutting machines have had varied success. The greatest advantage obtained from their use, in a mine or section of a mine where the top is tender, lies in the protection afforded the roof from the shock and vibrations from the explosion. This protection in most cases, however, will be obtained at the expense of the production of lump coal. In the Pittsburgh bed difficulty has been experienced, with the arcwall type of machine, in obtaining a top cut of uniform depth where the room or entry in which the cut is made is more than 12 ft. wide. In practically all cases the depth of the cut is greater in the center than at either rib. As a result of this variation in the depth of topcut, the holes cannot be placed in positions that will enable them to break down the coal without undue shattering. Great difficulty is experienced in successfully blasting after this type of machine, as the shots under a topcut will not "roll" the front of the cut as will those over an undercut.

If topcut places could also be sheared, one would then have two well-balanced shoulders which would increase the size of the coal considerably. Here again the added investment, cost of operation and prospective financial return would be the factors that would determine whether it is wise to introduce this method.

The relation existing between the cut and the blasting of the coal has been briefly outlined. Closely allied with the cutting operation and of vital importance in obtaining good blasting conditions with the use of a minimum quantity of explosive per cut, is the removal of the bugdust from the kerf before blasting.

The only reason for machine-cutting coal is to provide an additional plane of weakness or free face against which the explosive charge can act. The height of the kerf made by a machine when free from cuttings is about 6 in. With a 6-ft. cut in a 12-ft. entry this void amounts to 36 cu.ft. When all the bugdust is removed from the cut, the coal when shot can expand into this space in addition to being rolled forward into the working place. If only half the cuttings are removed, the coal can expand only a proportionate amount in this direction and consequently must be pushed forward into the room.

WHY CUT COAL IF BUGDUST IS LEFT?

To move the coal through this additional distance more explosive is required, which necessarily results in greater shattering. Under these conditions if enough explosive to heave the coal forward into the room is not used, the coal will be wedged in place and it will be necessary for the miner to dig out the shot. This will produce a maximum of fines, to say nothing of lowering the output of the miner. Probably no single factor upon which efficient blasting depends is more important than the proper cleaning of cuts.

To assure the removal of all bugdust one or both of two things must be done. The helper, or scraper, on the machine crew must shovel away from the machine all the cuttings thrown back by the bits. This will allow the cutters to clear themselves, thus minimizing the quantity of cuttings carried back into the kerf. With proper attention 70 per cent of the cuttings can be removed in this manner. In mines where blasting is done during the loading shift each miner should provide himself with either a hoe-shaped scraper or a long-handled shovel, with which he can remove all the loose material from the cut before shooting. By observing these two precautions full advantage of the cut will be obtained.

To compel the machine men to keep the cuts clean the inside officials must make frequent inspections of

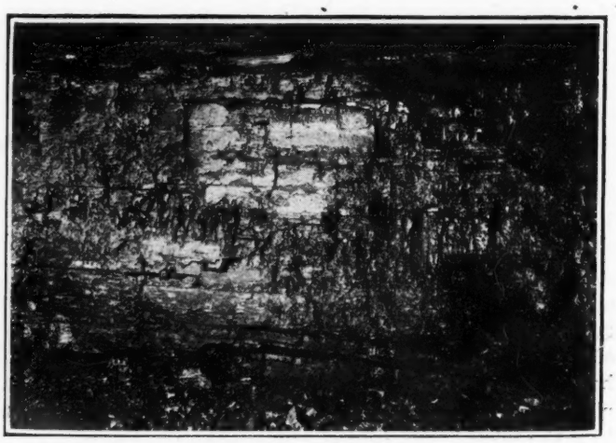


Fig. 5—Coal Well Fractured, but Not Shattered

In many cases explosives, no matter how used, will not throw the coal from the face. In such instances the best result that can be expected is the development of fractures which indicate a loosening of the material. The miner's pick or some other mechanical device must complete the job.

the fresh cuts. When one that has not been cleaned is found they should call it to the attention of the machine men. In making these inspections, it is well to use a flashlight so that the back of the cut may be clearly seen. Clean cuts are essential, even when the production of lump coal is not the primary object sought. Coal cannot be efficiently blasted if the machine cuts are not clean.

Where shotfirers blast the coal during the loading shift and lump coal is desired, they should be instructed not to charge or shoot cuts from which the bugdust has not been removed.

Fig. 6—Too Much Explosives Used in a Tight Shot

In the thick coal of the Pittsburgh bed no successful scheme has yet been developed to roll forward the coal from a tight shot. Although this shot has been overcharged, as shown by the shattering effect on the face, the coal has not been thrown outward into the room.

Proper placement of holes for blasting depends primarily upon a number of factors, chief of which are the thickness of the coal, the depth of the cut, the direction and character of the cleavage, the hardness and brittleness of the coal, the natural weakness planes, the character of the roof and the bottom and the nature of the binders or other impurities.

MAY HAVE TO SHOOT IN BENCHES

The thickness of the coal will largely determine whether all the material between roof and bottom can be brought down at once or whether it should be removed in two or more benches. Wherever the coal is of such thickness and nature as to permit the practice, it is advisable to bring it all down in one lift. This reduces the number of holes and consequently the quantity of explosive necessary and the degree of shattering.

The depth of the cut naturally should be dependent upon the thickness of the coal and upon its relative resistance in different directions. This latter factor cannot be considered in the abstract. Coal cannot be successfully blasted in a 3½-ft. bed by means of a 9-ft. cut—at least not with the present conventional method of tamping. The distance from the end of the explosive charge to the face would be so much greater than that from the charge to the kerf that the force of the explosive would be expended toward the undercut, leaving the face practically unaffected.

Holes for blasting should be of such depth and location as to place a well-balanced load on the explosive charge. The cut should therefore be of such depth as to offer in all directions the least possible resistance to the explosive force generated.

The direction and character of the cleavage of the coal, if any, should be studied and the holes should be so placed as to derive the greatest possible advantages from these planes of weakness. Disregard of this consideration may result in unnecessary holes and in a material increase in the percentage of slack coal brought down.

In deciding on the number of holes to be drilled it is of prime importance to study the character of the coal itself. If it is of a woody structure, the holes should not be placed in the same manner as they would be if the coal were hard and brittle. Most coals have certain horizontal planes of weakness which may aid greatly in bringing down the material if the holes are so placed as to take advantage of these natural weaknesses.

Where the roof must be protected from the shock of the explosion, care should be taken to keep the holes as far away from it as possible, without losing sight of the fact, however, that the coal near the roof must be either loosened by the blast, or it must be dug or wedged down by hand.

BINDER DETERMINES SHOT PLACING

Probably the number and the resistance of the binders and bands play a greater part in determining the number and location of the holes than any of the abovementioned factors. The holes must be so placed and the charges so proportioned that the explosive will effectively break these bands or binders and loosen the coal properly and yet at the same time prevent an undue shattering or pulverization of these impurities. It is not possible in a general discussion to give the number and direction of holes needed to meet all conditions. Experiments must be made to solve this problem for each mine.

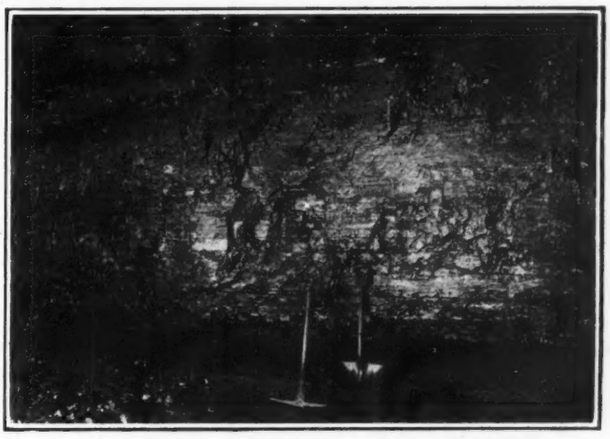


Fig. 7—Hand-Snubbing in the Pittsburgh Bed

This snub cut is started at a point 10 in. above the kerf at the front and extended downward and backward until it meets the kerf at a point 3 ft. in the rear of the face. An attempt was made in this instance to roll the coal forward. A number of similar tests in high coal in the Pittsburgh bed failed in their purpose. The coal being mined is about 7 ft. thick.

Much discussion during the past three years has centered about the proper sizes of cartridges to be employed and their relative advantages and disadvantages. Many experiments have been made by explosives engineers and technical representatives of the various powder companies with cartridges of small size. As a rule powder companies have objected more or less strenuously to the use of explosives of less than 1¼-in. diameter when these explosives have an ammonium-

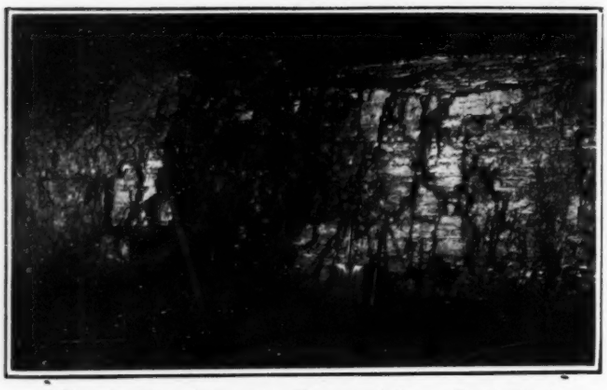


Fig. 8—Face Properly Prepared for a Butt Shot

In the Pittsburgh bed the common practice is to blast the coal with two shots. The place shown in the illustration is 22 ft. wide. The first or tight shot breaks the coal in the cut across about two-thirds of this width. After this initial shot is fired the miner props up what coal remains in place. The butt shot is fired after the coal dislodged by the tight shot has been loaded out.

nitrate base. Their objections have been founded upon the rate of deterioration of an explosive in relation to the diameter of the cartridge. The powder companies have justly claimed that as the diameter is lessened the rate of deterioration is increased. Naturally an explosive cartridge of 1½-in. diameter would lose its strength from deterioration more rapidly than one of 1⅛-in. diameter. The manufacturers, therefore, have objected to making cartridges of small caliber, knowing that they would be held responsible for powder that becomes insensitive to detonation.

As will be shown later, the viewpoint of the explosive engineers has been diametrically opposed to that of the powder companies. Various tests have been made to determine the relative advantages and disadvantages of different lengths of explosive charge. The means employed to increase the charge length are known by numerous terms—air-spacing, and cushioned-blasting being the most common.

SPREADING THE CHARGE OVER HOLE

Results have proved that the relation of the length of explosive charge to the length of the hole is an important factor in the blasting of machine-cut coal. It has been found that most coals do not offer the same resistance to breakage in all directions because certain natural planes of weakness are present in them.

In many instances well-defined cleavage planes or slips are found which run more or less perpendicular to the bedding planes. These, and other irregularities, cause the resistance to vary in different directions. It also is true that the thickness of the coal and the depth of the undercut usually hold no fixed relation to one another. One must therefore take all these factors into consideration when trying to determine the length of charge best adapted to blast the coal economically and efficiently.

Satisfactory results from blasting cannot be obtained unless the shots are well-balanced. To provide this balance, the charge should be placed in the holes in such a manner as to assure equal resistances of the coal to the expanding gases in all directions. Should the resistance be unequal, the gases evolved, following the laws of physics, will act toward the line of least resistance. This gives inefficient blasting and entails the use of an excessive quantity of explosive. To remedy it, the depth of undercut and its relation to the thickness of the bed, as well as to the physical characteristics of the coal itself, must be known.

When these factors are ascertained, a theoretical determination of the proper length of charge can be made. For example, if the coal is undercut to a depth equivalent to its thickness, and its resistance is the same toward both free faces, the explosive charge should be placed as near to the back of the hole as possible in order that the expanding gases may not have an easier escape in one direction than in another. If the resistance is greater toward the front of the cut than toward the top of the kerf (in an undercut) tests must be made to determine the relative resistances in these two directions.

This relative resistance being determined, the explosive should be so placed as to put the front of the charge proportionately nearer the face than the top of the kerf in order that the burden on the explosive may be well-balanced. In connection with this problem the diameter of the cartridge plays an important part.

SMALL CARTRIDGES WOULD BE BETTER

With 1¼-in. cartridges one may find that a long charge cannot be used without overloading the holes. Under such conditions it would be advisable to use smaller cartridges so as to distribute the charge over this greater length. This procedure is necessary in districts where air spacing is prohibited. Where such spacing is allowed, the explosives charge can be lengthened so as to obtain a blasting balance by the use of compressible dummies, in conjunction with cartridges of large diameter.

In a bed in which the resistance toward the kerf is greater than toward the face, well-balanced shots cannot be produced with one row of holes. Under these conditions the coal must be blasted in two or more benches. That portion which is brought down in the first bench should be loaded out before the upper bench or benches are blasted in order to provide room for the expansion of the remaining coal. The material from the upper benches should not be allowed too great a fall, for the coal may be unduly shattered.

The foregoing discussion shows that no cure-all is known for the troubles encountered in blasting coal. Each bed and often each mine is a problem within itself and must be treated as such.

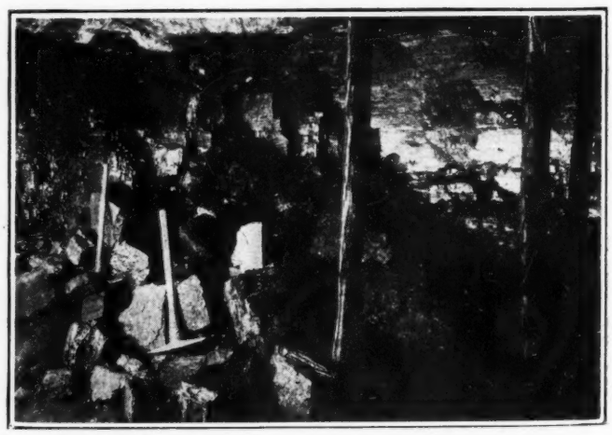


Fig. 9—Coal After a Successful Butt Shot

The condition of this coal was not staged; it shows the exact position that it assumed as the result of a shot. Much of it has been rolled out in lumps that can be conveniently handled by the miner. The coal which is still standing is sufficiently jarred and broken as to fall forward with little picking.

Fig. 10—Face After an Overcharged Butt Shot

Too much explosive in a butt shot has caused the coal to be unduly broken and blown for some distance from the solid face. Note how severely the material in the foreground has been shattered.

Clay is one of the best stemming materials that can be used. Care must be taken not to store it in wet places where it will soon become so soft and soggy as to be unsuited for stemming. It should be stored in crosscuts or room necks at distances convenient to the miners.

Education in blasting is sorely neglected at most mines. This is as true of the officials as of the men. Usually the method of blasting and the placing of holes that is practiced at any particular mine are believed to be the best possible not because they are the result of study and test, but because they are customary. The average mining man knows little or nothing of the characteristics of the different explosives on the market. What is true of explosives is true also of detonators, as also of the effect of the diameter of the cartridges and of the proper placing of the detonator in the explosive charge. Colliery superintendents should arrange to have at their safety meetings, men who know how to blast coal, so that they can teach the employees the most approved methods. Safety practices, as used by different companies should be studied and comparisons made in order that a safe and workable set of rules may be formulated. The shotfirers should attend such meetings whenever blasting is the topic for discussion. Suggestions and recommendations from these men should be given careful consideration.

To obtain an efficient blasting practice and to produce a satisfactory quality of coal. a thorough study must be made and a uniform practice instituted. This much having been accomplished, close supervision must be provided, and unofficial variations from standard practice must be prohibited.

Can Gas Be Made at Mines With Profit?

Big cities have frequently risen amid the mining areas that were the sources of their wealth and opportunity, but they now draw their supplies from a distance, for the mines have been depleted by their many years of operation. Thus mining installations become further and further removed from a possible market for gas. Some mines always had that disadvantage and many that did not have it would have found, had they tried to make gas, that they had an active competitor in natural gas such as would have made the artificial product an impossibly expensive fuel, wherever, at the mines or elsewhere, an attempt might have been made to manufacture it. The question arises therefore: should coal be shipped to the city for the manufacture of gas or should it be coked or otherwise gasified at the mines, the gas being conducted in pipe lines to the industrial centers?

Load Fluctuations Trouble Gas Men

W. W. Freeman, of Cincinnati, president of the Union Gas & Electric Co., discussed this subject for the benefit of the members of the Charleston, W. Va., section of the American Institute of Mining & Metallurgical Engineers, giving the reasons why gas usually had to be manufactured out of coal on which a heavy freight charge had been paid instead of out of coal that was debited with no such charges.

He said that load fluctuations are the chief worry of the gas companies. It is impractical to build transmission pipe lines 150 to 175 miles long large enough to handle the usual ten- to fifteen-day maximum winter peak. For this reason the logical place for a gas-making plant to reinforce the supply of natural gas is at the point of distribution rather than at the mines.

The demand for gas in Cincinnati is normally 3½ times higher in the winter than in the summer, and about 50 per cent of the year's sale is during the four winter months. The encouragement given to house heating only makes the situation worse. The mixing of artificial and natural gas is a difficult problem because a marked change in the percentages requires a readjustment of the customers' burners.

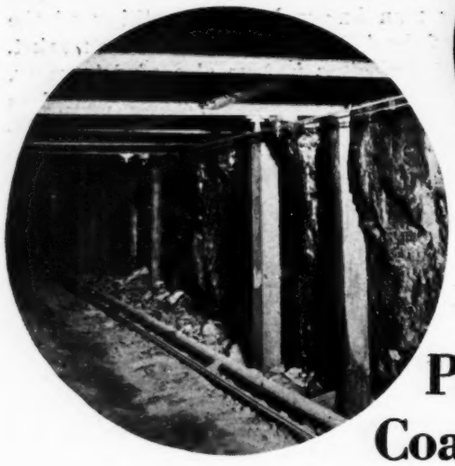
In discussing the paper, Mr. Forrest described the manner in which peakloads are handled in Chicago. Sufficient byproduct ovens to satisfy the maximum winter demands would involve an expenditure entirely out of all reason. At present the coke ovens have a capacity of twelve to fourteen million cubic feet. Producer plants have a capacity of about twenty-five million, and water-gas plants another twenty-five million. These latter installations, which cost far less than byproduct coke ovens, take care of peakloads, but the gas they make costs far more than if made in a coke plant.

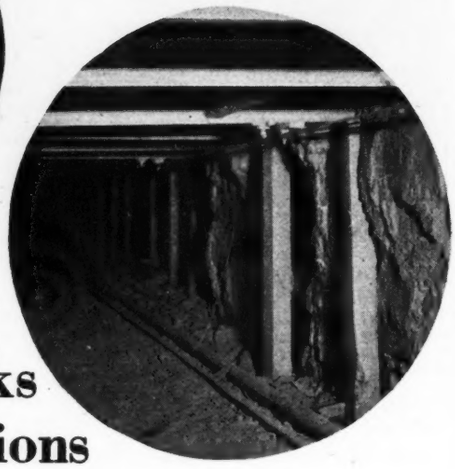
Near Fairmont, W. Va., a byproduct plant is now operating which delivers artificial gas into the mains originally laid for the purpose of supplying the natural product. The new plant supplements the wells, the production of which is slowly decreasing. S. A. Taylor, consulting engineer, of Pittsburgh, Pa., and president, A. I. M. E., said that locations remote from cities have been selected by a certain large gas company for the building of new plants. These locations are chosen so as to make effective use of the large investment already expended in pipe lines. As the lines are already installed, the plant can be located somewhere near the coal supply.

OVER ONE-FOURTH OF THE RAINFALL that falls on the surface above the mines percolates into the workings according to R. D. Leitch, associate chemical engineer, U. S. Bureau of Mines, Pittsburgh, Pa. In fact he quotes the figure as 27 per cent of the annual rainfall and adds that, except from shallow workings, the mine drainage flows are said to be quite constant and to vary little with the occurrence of rain, whereas the flow in surface streams varies considerably from time to time. The maximum and minimum discharge from mines varies only about 17 per cent from the average.

In center—Man stone-dusting with compressed air at Talk O'Th'Hill Colliery, near Stoke-on-Trent, Staffordshire, England

Below—Rock-dusting at the Inland Collieries, Indianola, Pa.; on left, a light application, on right, an efficient coat of dust





Rock-Dusting Promptly Checks Coal-Dust Explosions

Even Where Dust Is Wet Pulverized Rock Is Helpful—Not Only Roadways but Airways Also Should Be Strewn with Rock Dust — Barriers Valuable Especially at Strategic Points

By J. W. Paul and C. A. Herbert
U. S. Bureau of Mines

DESPITE THE ABSENCE of explosive gas, coal dust, when in a dense cloud in the air, may be ignited by an open light or an electric arc or by the flame from a non-permissible explosive, and being confined by the ribs, roof and bottom of the mine may quickly assume a rate of combustion that gives great and violent explosion effects.

A coal-dust explosion once started does not depend upon external application of heat or flame to keep it active, but may gradually or suddenly increase in violence in its travel through a mine. A coal-dust explosion is self-sustaining and will propagate so long as enough coal dust has been raised in its path to sustain combustion. Counteracting influences are of many kinds: (1) Obstructions which can be moved or destroyed, and which can thus transform some of the heat into kinetic energy, (2) The arrival of the explosion at places of large cross-section which permit of an expansion of the hot gases of combustion, thus reducing the heat, pressure and velocity of the gases to such an extent that the explosive violence declines and a sufficient density of coal dust is not raised in the path of the explosion, and (3) Long stretches in the roadways traversed by the explosion where roof, ribs and bottom are wet and thus retard combustion by the absorption of heat.

Nevertheless, where the advance air waves have carried an excess of coal dust, an explosion has been found to extend through a wet entry as much as 500 ft., continuing to propagate in the dry zone beyond with continued violence. Coal-dust explosions in mines have traveled with equal violenee in the intake and return air currents, and in a number of shaft mines the explosion has passed across the bottom of an intake shaft and continued along the intake current to all sections of the mine.

Many demonstrations in this country and in Europe have shown conclusively that coal-dust explosions may be prevented, controlled and stopped by the use of rock dust when it is either mixed with the coal dust or placed in barriers which drop it in large quantity in the path of the advancing flame of the explosion. In quenching the flame of a coal-dust explosion, rock dust acts as a heat absorber. It serves to best advantage when it is dry and capable of being raised into a cloud through the shock or concussion waves set in motion by the oncoming explosion.

Where a zone is moist, rock-dusting will also help. It has been found that when rock dust was strewn over or mixed with coal dust and, where through the humidity of the air current, surfaces become damp or wet, the moisture, by reason of the greater capillarity of the rock dust, wets the coal-dust particles with which the rock dust is in contact. Coal dust, when not mixed with an absorbent material, tends to repel water. Another advantage of damp or wet rock dust is that it imprisons the coal dust with which it comes in contact and in this manner prevents it from being raised in the air by concussion. Consequently, whether a zone is wet or dry, rock-dusting is of great value in the prevention of coal-dust explosions. However, dry rock dust is always preferable to wet, because of its readiness to rise as a cloud and dampen the flame of an explosion.

It has been shown in repeated tests in the Experimental Mine of the Bureau that rock dust when properly used is 100 per cent efficient.

The question then arises, What has been the efficiency of rock-dusting in coal mines where rock dust

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Before Rock-Dusting, Main Haulage, Montour No. 10

A rib in the roadway of one of the mines of the Pittsburgh Coal Co. Its multiplicity of ledges holds quantities of dust ready to be blown into the air by the advance waves of an explosion.

has been applied and where it has had opportunity to show its beneficial effects in stopping, or in a manner controlling, the spread of an explosion?

Explosions in mines, where rock dust has been distributed both by the strewing, or broadcasting, methods and by barriers, have been studied both here and in Europe, and it has been found that the range of the explosion has been controlled by the rock dust when only one of a pair of parallel entries or tunnels has been thus treated, but in each case the range of the explosion was greater than where the other parallel entry had been similarly treated.

The reason for this is made clear by a study of the pressures developed by a coal-dust explosion and the velocity it attains. In order to propagate an explosion that has gotten under way, as at the face of a working place, a dense cloud of dust must be raised in front of the advancing flame. To accomplish this, *air* waves of a high velocity must be created, and these are dependent upon the relative pressures set up by the advancing *explosion* wave. If this pressure is sufficiently reduced, the explosion wave will lose speed, and the air waves will cease to stir up the coal dust in sufficient density to admit of its flammation and propagation.

Both Entries Should Be Treated

It is apparent that, when rock dust is applied to only one of a pair of entries, the destruction will extend much further than if both had been rock-dusted, and this has been fully demonstrated in commercial mines where failure to rock-dust a trackless entry has permitted a dust explosion to extend over a relatively wide area, whereas the rock-dusted entry gave no evidence of the passage of flame.

Explosions which in some mines were of frequent occurrence have ceased to devastate such workings since they have been completely rock-dusted. In other mines that have been only partly rock-dusted, explosions have occurred and traveled relatively long distances, occasioning loss of life and doing much property damage. They were stopped only through the cumulative effect of the rock dust.

In mines relying wholly upon barriers, these protective devices have extinguished explosions only, however, after much violence has been exhibited and much destruction has been done. For this reason some mines originally equipped with barriers, have modified their practice and adopted that of strewing, or broadcasting, the rock dust throughout the mine, using barriers as supplementary only to the generalized rock dusting.

In a district where, under certain mining methods, previous explosions have extended throughout an entire mine or a large part of a mine, it has been noted that under similar mining conditions, where rock dust has been applied, explosions have been localized. It has been observed also that in a mine only partly treated with rock dust, the explosion covered a wider range. It, therefore, is essential that rock dust be applied throughout the mine if maximum safety is to be obtained. In concentrated methods of mining where machinery is used for cutting, loading and hauling the coal, many men may be at work within a small area, and to protect these men, rock-dusting should be applied as near the working places as conditions will admit.

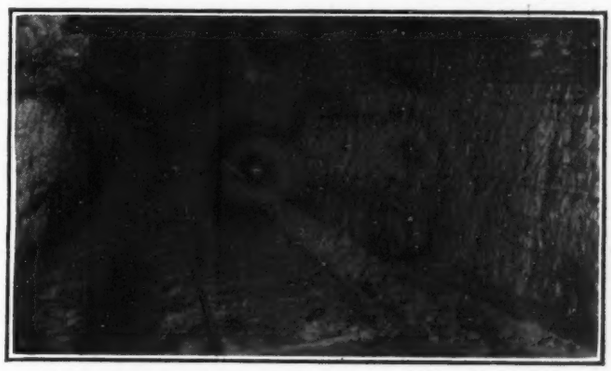
The experience of the Old Ben mines in Illinois, as described by J. E. Jones, was that, though barriers had stopped several explosions, the damage done and the risk to life were such as to show that the barriers did not afford the most efficient means of protection. Broadcasting of rock dust was, therefore, adopted as more efficient. Since then there has been no record of an explosion gaining any headway in any of these mines.

All But One Might Have Survived

In a mine in western Kentucky, rock dust had been broadcasted throughout the roadways up to a certain point. While preparations were being made to finish the job, a gas explosion in the untreated section ignited the coal dust. All the men in the district that had not been rock-dusted were killed, but those in the adjacent rock-dusted entries escaped uninjured, the explosion having terminated when it reached the rock-dusted part of the mine. Had the affected portion of the workings been rock-dusted, probably all would have been saved but the person who ignited the gas.

The New Orient mine in Illinois had been rock-dusted and only a few of the entries remained to be treated when an explosion of gas started a coal-dust explosion. This traveled along the untreated entries until it reached the rock-dusted area, where it was stopped. Moisture along part of the zone that the explosion traveled no doubt assisted in its retardation by furnishing no additional coal dust for fuel. However, the explosion, carrying dry coal dust from inby points, would have continued indefinitely but for the rock-dusting beyond the damp zone.

It was brought out in the official hearing following the explosion at the Horning No. 4 Mine, near Pitts-



After Rock-Dusting, Main Haulage, Montour No. 10

The Pittsburgh Coal Co. has had heavy operating losses but nevertheless has been rock-dusting its mines faithfully, even to designing a machine for that purpose. An unsafe mine is not only an offense against society but an undesirable property to operate.

burgh, Pa., that the pair of entries in which the explosion occurred had been rock-dusted only on one entry and for a length of but 100 ft., however the main haulage up to the pair of entries had been treated with rock dust, and this was an important factor in the control of the violence of the explosion, which subsided through the cumulative influence of the rock dust in the part of the mine involved. This emphasizes the importance of applying rock dust to the airways and other parts not used as haulage roads.

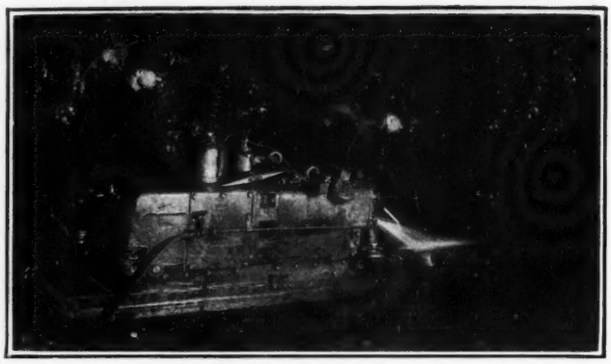
In the study of a large number of mine explosions it has been found that where tight mine cars have been used without heaping the coal above the top, and where good track has been maintained, little, if any, coal has been spilled along the haulageway. In some of these mines the roof or bottom had been brushed to provide height, and this brushing had resulted in leaving an appreciable quantity of shale in a fine state which acted as rock dust. In these zones the violence of the explosion has been noticeably reduced, and in some cases the explosion has been checked or stopped, by the inert material which the advance wave of the explosion raised into a cloud.

Great risk is taken when only part of a mine is treated with rock dust, such as the haulage roads, leaving the aircourses and trackless entries without this protection. A practice such as this invites disaster and when an explosion travels any distance in a rock-dusted mine it is conclusive evidence that the rock-dusting has been neglected or that some part of the mine has not been treated.

Undercutting Coal Without the Use of Water

A dense cloud of dust was raised in undercutting. This, the illustration does not show clearly. It is easy to see how large a quantity of dust is formed to serve as a powerful explosive should it be raised in the air and then become ignited.

Rock-dusting calls for maintenance and this can be accomplished only by frequent sampling and analysis of the dust on the floor, rib, roof and timber to determine whether a new application of rock dust is needed. Rock dust, unlike water, does not evaporate and when applied in a mine it "stays put," but as coal dust is constantly being made and collects in the mine, in course of time the rock dust will need to be replenished if the combustible is to be kept at a minimum. In order to determine the need for a renewal of the rock dust samples should be taken from the roof and ribs in the various sections of mine. At the same places other samples should be collected by gathering the dust in a line across the floor. These samples should be kept separate for analysis or for determination by the volumeter, which latter gives a quick method for determining the inert material present. (This method is described in Bureau of Mines Technical Paper 144, which may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 10c.)



Undercutting with Water Playing on Cutter Bar

Thus dampened the air is cleared of dust particles, both while cutting the kerf and loading the dust. Fine coal does not blow off the cars in transport and if an underground dump is used less dust by far than is usual is set free to distribute itself on the mine timbers, rib ledges, floors of passages and other points of collection.

The strewing, scattering or broadcasting of rock dust is the most efficient method by which it can be applied. Where only dust barriers are provided they may fail to stop a weak explosion near its place of origin, as the explosion may travel some distance before it assumes such violence as will operate a barrier, and meanwhile the explosion will do much damage and may take many lives. Barriers are intended only as a second line of defense in connection with the broadcasting of rock dust and are best suited for installation in entries connecting two mines, at entrances to abandoned or worked-out areas and at the entrances to panels or sections of mine workings.

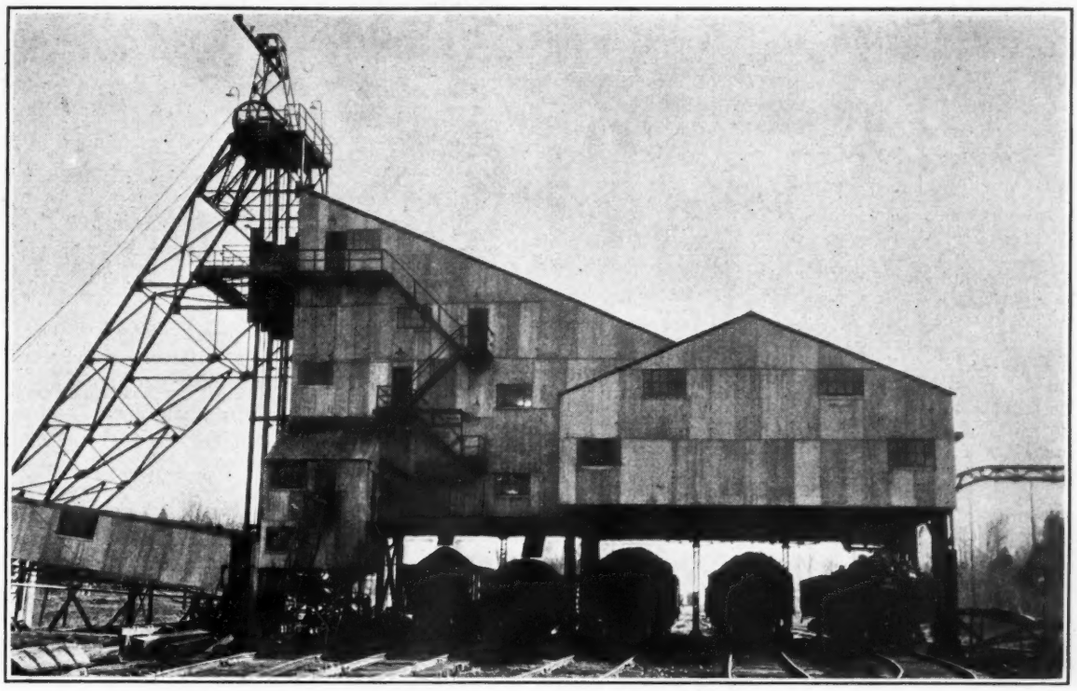
Rock dust properly applied and maintained is a panacea for coal-dust explosions, and when its use has become a daily routine at all bituminous coal mines, the wholesale loss of life in mines will be at an end. No longer will large numbers of lives be lost by explosions extending through a large portion of a mine.

V-Troughs Last Long and Are Cheap

"The proper placement of rock-dust barriers has been a matter of some discussion," remarked Robert M. Lambie and Gordon MacVean in an article delivered before the Charleston (W. Va.) section of the American Institute of Mining and Metallurgical Engineers. "It must be realized that they are essentially of the nature of a secondary defense. Their use is to isolate abandoned workings, to separate interconnected mines from each other, to protect entries which cannot be given a general coating of dust, such as aircourses.

"There are numerous types of barriers in use but by far the greater number are the so-called 'V-trough' barriers. In general, practice in this country so far has been to place this preventive equipment in the returns of all air splits, the barriers to carry 100 lb. per square foot of cross-section. Each V-trough holds about 200 lb. of dust. In a 7x5-ft. aircourse from fifteen to twenty troughs to a barrier would be needed.

"The cost per set of fifteen troughs at Mine No. 8, of the Pittsburgh Terminal Coal Co., has been given as $44.55; per set of twenty-one troughs at Naomi Mine of the Hillman Coal & Coke Co., $47.88. The cost per V-trough varies from $2.25 to $3.60.



Coal Industry Greatly Needs to Reorganize and Reconstruct Its Operating Methods

Mergers Do Not Reduce Excessive Output—Big Tonnage, Lower Cost and Falling Prices Form Vicious Circle — Specialized Brains Needed to Rèvamp Mines — Manufacturing Methods Should Be Adopted

By John A. Garcia
Consulting Engineer, Chicago, Ill.

MUCH CONFUSION between cause and effect exists in the mind of the public and in that of many coal operators as to the solution of the problems confronting the coal industry. One of the main reasons for the continued failure to attain stabilization is the repeated effort to cure the effect without removing the cause of the trouble. This, admittedly, is over production.

There are cries for mergers but such consolidations, with few exceptions, do not in practice reduce output, but in many cases actually increase the total production. Some of the mines merged may, it is true, be shut down or abandoned as a result of the merger, but the output of the consolidated property is likely to be, and usually is, larger than that of the many units out of which it was created.

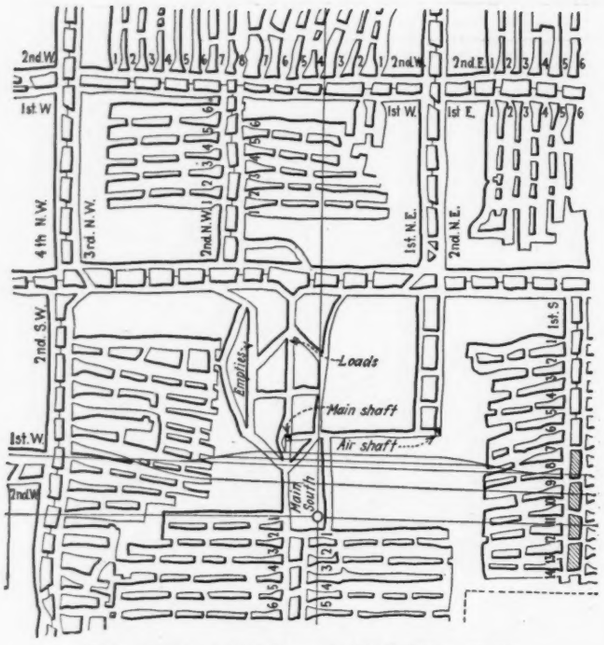
And again, there are cries for a reduction in the wage scale, but the net result to the operator of such a decrease would be little, in either the union or the open-shop fields, unless the differential between the two were changed by the readjustment, for the margin between cost and revenue will remain fixed should the wages in the two sections advance or recede simultaneously and in the same ratio.

The coal industry travels in a cycle. Increased output is advocated for the purpose of decreasing cost, but the outcome of the large tonnage is a lower price that defeats the ends so diligently sought. Further efforts are made to increase tonnage so as to lower costs accordingly and that decreased cost is met by further price reductions. The cycle is vicious. Unless it is broken there is no prospect of rehabilitating the industry.

Although mergers tend, as has been often said, to lower the cost of selling and administration, they usually create an offsetting disadvantage by fastening on the industry fixed charges for the interest on bonds. Before the merger the properties were financed by stock, and consequently the reorganization has replaced an optional dividend with a legal demand that can be met only by the production of coal for less than the market price.

Instead of boosting output to get lower cost it appears logical, in view of the cycle just cited, to decrease cost and at the same time to reduce the capacity of the mines. This apparently rash suggestion may not appear so impossible after examining the operations and records of a few companies where the "New Idea" has found lodgment.

The headpiece shows a modern tipple where only one man is needed at the dump yet the capacity is 4,000 tons daily. Compare this with the tipple that heads the right column of page 731. Here eight men manage with difficulty to load 2,000 tons per day. Who shall say we do not progress?



They Hoist 3,000 Tons at This Mine Daily

A great credit to the management that it thus overcomes the difficulties of layout and equipment. However it takes eight men to turn the trick. You can do wonders, if only you have the men, as Pharoah proved when he built the pyramids.

This plan, simply stated, is to regard the mine as a manufacturing plant and to upset the traditional notion that each miner shall be permitted to work in relative independence. In my opinion this may be done in part by replacing room-and-pillar mining with its many disadvantages by what is generally known as "modified longwall" thus permitting a real concentration of the workings.

In order to illustrate how concentration reduces the area of workings, assume a seam adapted to such concentration say 5 ft. thick. On a longwall face, 200 ft. long, with a 6-ft. undercut, 240 tons would be shot down. Even at the low average output of 12 tons per loader only twenty men would be required to shovel this coal. In practice the figures probably would be reversed, the tonnage per man would be 20 tons per day and the number of men employed twelve instead of twenty.

This same tonnage could be produced with rooms and pillars, only by working twenty-four places with a loader in each whose average production would be 10 tons. If the rooms were placed on about 40-ft. centers the lineal extent of development would be 960 ft. or almost five times as great a length as with a longwall face. This, however, may not represent actual conditions, but a mine that I recently examined showed only 12 per cent of the narrow-work coal being worked on the advance and 6 per cent being worked on the retreat or a total of 18 per cent.

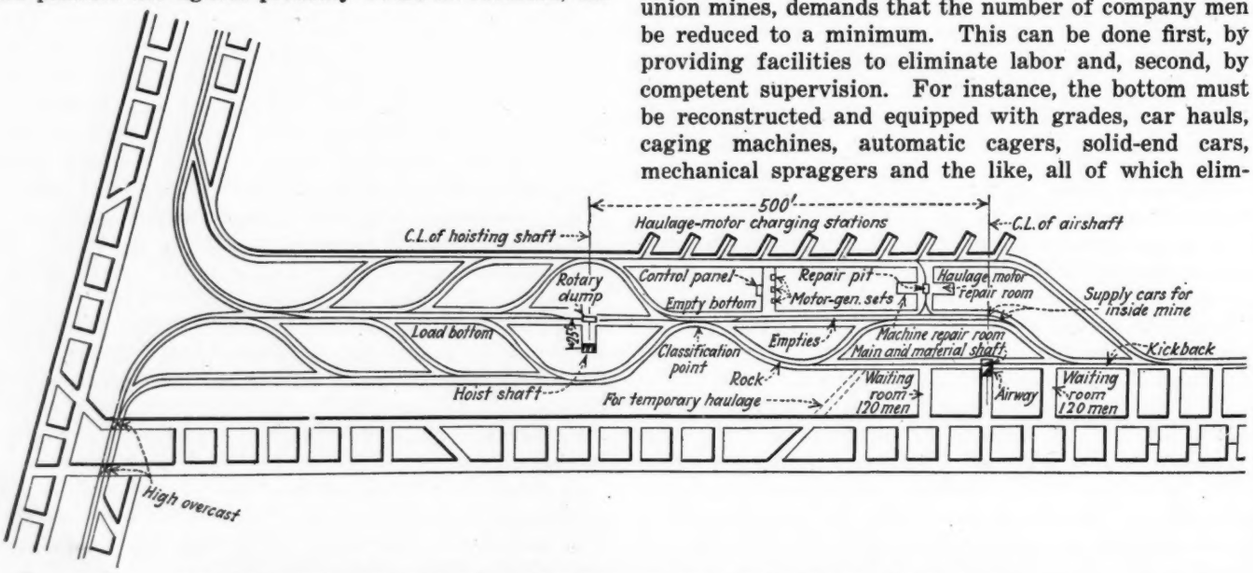
With face conveyors loaded by hand or with loading machines that place the coal directly into cars, whether the room-and-pillar or the modified longwall system is used, a different gathering and haulage system must be provided from that which serves for ordinary operations where such loading equipment has not been introduced.

MUST ADD SPACE, BINS AND CRUSHERS

With mechanicalization of loading, a well-trained and intelligent operating staff is made necessary and the problem of coal cleaning is accentuated. Machine loading necessitates the reconstruction or, at least, the rearrangement of the surface facilities. The sized coal of over 3-in. diameter may be cleaned by hand, but the tables will have to be extended so as to provide additional space. Conveyors to handle the refuse will also be needed. Small crushers must be installed to reduce the burnable refuse to nut or screenings. Bins and storage facilities must also be provided to facilitate refuse disposal.

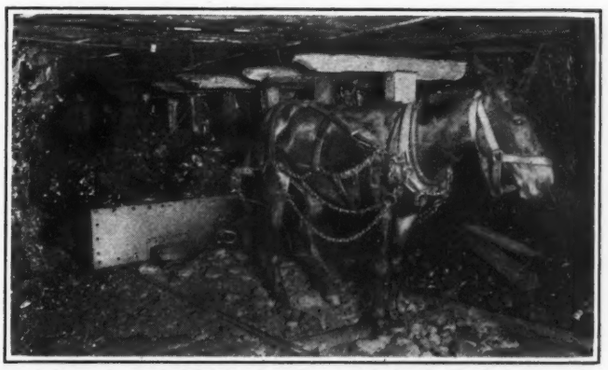
Coal of less than 3-in. diameter, and certainly all under 2 in. cannot be hand-picked economically, so that the reconstruction program will require a plant for cleaning this material. Several means are available for this service—water, air, oil, flotation, or combinations of these—each with its special advantage but all calling for new equipment, structures, skillful engineering and intelligent operation.

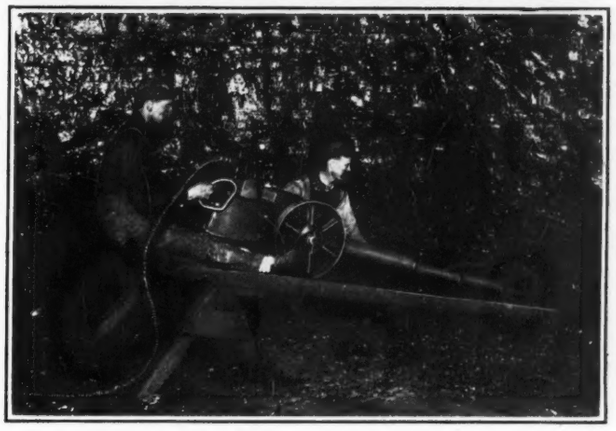
The high wage scale, especially that prevailing at union mines, demands that the number of company men be reduced to a minimum. This can be done first, by providing facilities to eliminate labor and, second, by competent supervision. For instance, the bottom must be reconstructed and equipped with grades, car hauls, caging machines, automatic cagers, solid-end cars, mechanical spraggers and the like, all of which elim-



Mine Bottom Designed for 10,000 Tons per Day with Only Five Men Needed

Here there is an adequate bottom for car storage, means for moving cars without labor, a rotary dump that empties cars without uncoupling and a skip shaft. This mine has produced 12,000 tons in a day. There are other facilities such as waiting rooms for men and motor charging stations which with their carefully chosen locations make matters for profitable study.





"Lest We Forget"—The Ways in Which Mining Used to Be Done but Rarely Is Performed Today

In the upper left illustration is shown the process of undercutting coal as it was actually done in 1900. Coal is said to be cut by hand pick in some mines today but as it is generally expressed we "let powder do the work." The lower left illustration shows the hoisting plant at Leaford, Ill. A few farmers' banks perhaps still use this means to raise coal. The upper right illustration features the mule. Less than thirty years ago a mule or a string of mules was quite generally the main-line unit. In the lower right illustration can be seen the coal puncher that in 1910 seemed to possess the field. "The electric cutters were large, heavy, expensive and of doubtful utility," some of us thought, but they came and conquered.

inate labor. Partings may be reduced in number and arranged for minimum labor cost in handling trips. Ample room, well-built switches, guard rails and other devices will prevent delays and de-railments. Cars must be so designed as to afford maximum capacity under the known conditions and a low maintenance cost with provision for easy oiling, and wheel replacement.

All construction work in permanent entries should be done in a manner and with materials that will avoid the constant renewal charge so common in many coal mines. The mainline stoppings should preferably be constructed of some permanent material, such as concrete, brick or tile, as should also the overcasts, pump rooms, repair shops, transformer stations and similar structures. The timbers on permanent roads, aircourses or manways should be of steel or treated wood, for in this item lies one of the most prolific sources of high repair costs.

The haulage system must be constructed for fast and safe traffic with roadway, drained and graded, and all timbering set with ample clearance. Maintaining a poorly built haulage system is an expensive item on the cost sheet, the work being done usually by the highest priced labor on the payroll, such as tracklayers, timbermen, and electricians, so that the best and most permanent construction at the start is the least expensive in the long run.

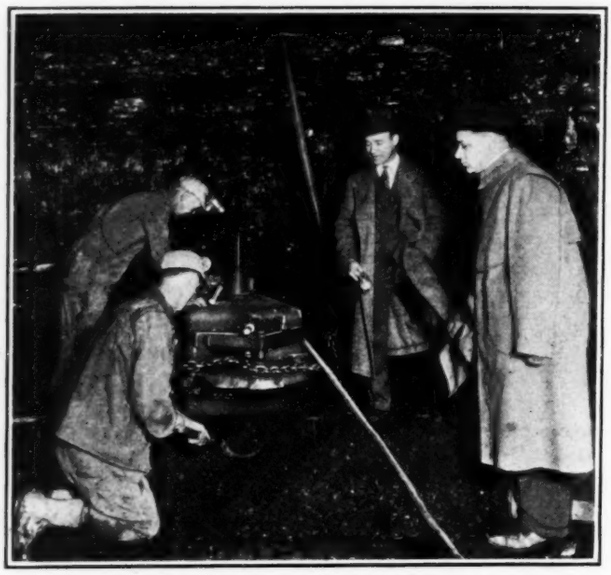
Savings in labor costs made possible by modernization may be illustrated by comparing a self-dumping cage mine with one using a stationary platform. In the former, not more than one man is needed at the dumping point, whereas, in a tipple where cars are pushed off the cage to the tipping point, the usual crew is eight men, making a difference in daily labor cost, at $6.50 per man per day, of $45. A great increase in hoisting capacity may also be realized with the first method.

Again five men at the shaft bottom will handle 12,000 tons per day where underground continuous rotary dump and skips are used, whereas eight men will be required where self-dumping cages are installed, and the hoisting capacity will be only about 6,000 tons. In the first case 2,400 tons will be handled per man and in the second only 750 tons. Thus with a rotary dump and skips the performance per man will be 220 per cent greater than it would be with self-dumping cages.

WITH NEW MINE CARS LARGE TONNAGE

Reconstruction of mine cars offers a fertile field for engineering skill, and large cost reductions are often possible by improving their design so as to increase their capacity. As this is written the data have been received on the first day's trial of a new car designed with the same governing dimensions as the equipment previously in service. The record indicates a capacity for the new car of 10,000 lb. against a maximum for the old car of 8,000 lb., or 25 per cent additional coal. This was accomplished with an increase in tare weight of only about 300 lb. It means that 25 per cent more coal may be hauled without any increase in cost, that fewer cars are handled all over the mine for the same output, and that dumping and hoisting operations are proportionally reduced.

Handling railroad cars on the surface is also a "point



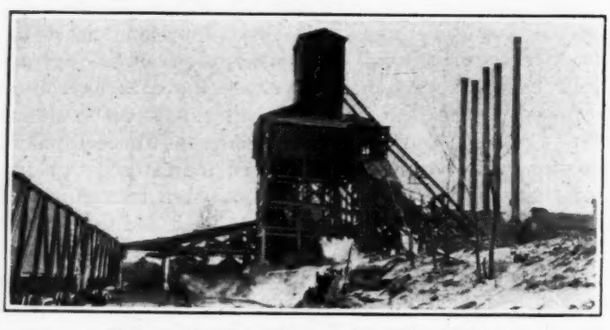
How Coal Is Machine-Cut in Present Decade

The labor-saving process has greatly progressed. It was easier to cut by air and to keep the pick in line by pressure of the feet (for after all it was gravity that advanced the puncher cutter to the face) than to do it by dint of hard blows of a pick swung by one's arms, but with modern machinery once the machine is in place it moves itself to accomplish its work and in some cases it travels by power into the room and out of it under the control of its master.

of attack" for the engineer seeking to convert a mine into a manufacturing plant. There is much room for improvement in the present customary method of "dropping" cars down a grade to and from the tipple. Car retarders under this structure are great labor- and time-savers and there are opportunities for cost reduction in the use of shunter locomotives with combined gravity and flat tracks, car hauls, and the like.

Reconstruction of the power plant and electrical distribution system at the average coal mine is a highly essential item and in the modernizing program, for the usual costs for steam and current are far too high. The advisability of purchasing power must be determined by careful analysis of each individual case. At many operations power generated at the mine would cost less than if purchased from a service company.

Where an ample water supply of the right quality is available and the plant can be reconstructed for truly economical steam generation using crushed picking-table refuse as a fuel, it is usually better practice to make power locally, though full consideration must be given to the load factor, idle days, night load, continuity of operations, and similar items.

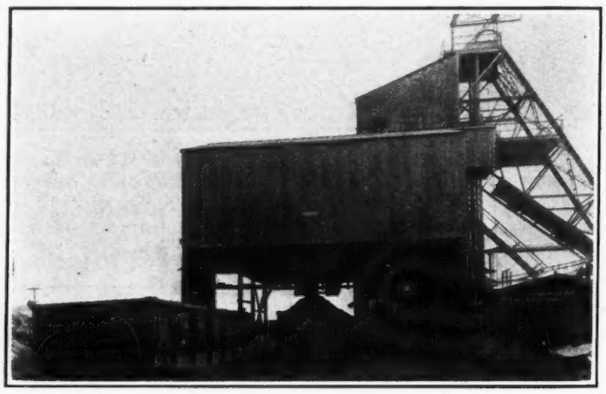


Before the Transformation Was Made

In early days hoist houses had to be high, for the coal went over the screens by gravity and even then the big railroad cars could scarcely get under the tipple and the screening was none too good. The degradation, of course, was excessive.

It is safe to say that most coal mines need to reconstruct their electrical distribution system, for with the customary 250-volt, direct-current methods of furnishing energy to outlying and isolated mining machines and motors, it is extremely difficult to obtain satisfactory results from the electrical equipment. Generation and distribution of alternating-current to rotaries installed at strategic points in the mine appears to be the logical system to use wherever the point of power consumption continually recedes from the generator. Life of mine, however, as well as cost of feeders, projected length of entries, state laws, and the like all must be considered in the study of this problem. Furthermore each mine must be treated individually.

All the items of reconstruction and many others entering into the complete conversion of a coal mine as now operated, into a plant for the manufacture of fuel call for a complete reorganization of the usual personnel in charge. Engineering skill of the best grade is needed during the period of rehabilitation. In operation, the haulage will require the same kind of brains that now manage the railroads; the generation, transmission and use of power must be accomplished with the same skill



After the New Tipple Was Built

The old rickety structure is replaced by steel, not so high as the old one but giving better preparation, more height for cars and allowing greater hoisting speed.

and management as is exercised by the officials of public utility companies and the cutting, drilling, shooting, loading and preparation, as well as the marketing of the coal must be regarded as much the same kind of problems as those confronted in the manufacture and sale of automobiles. Into these three lines of endeavor—railroads, public utility and automobile manufacture—has flowed the best engineering talent and executive ability that the land has produced, with the result that in these lines America today leads the world in efficiency, low cost, uninterrupted production, satisfied labor and continued development of new ideas and methods.

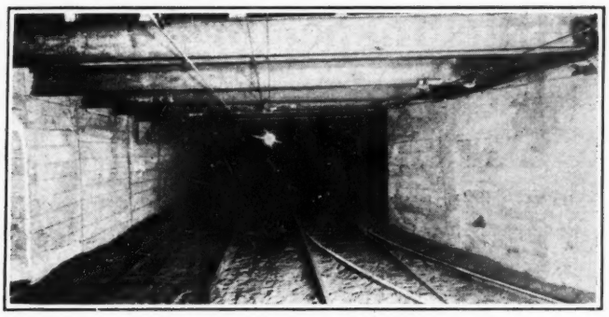
In bituminous-coal mining one district is pitted against another by differentials in labor rates, freight rates and natural conditions; interstate competition adds further confusion and, finally, the union and "open shop" sections of the country are in a constant struggle to satisfy a market the normal demand of which is about one-half the mine capacity.

Such a situation, without doubt, signifies the survival of the fittest, and no artificial reorganization of the industry such as mergers or reduced day-labor wage, can bring about stabilization. Such methods in order to be

effective must of necessity curtail output and reduce production costs in union fields. Reducing cost by cutting wages is the orthodox way of "managing" the average coal mine. It would appear, however, that this idea must pass and that the management of the profitable mine of the future will consider "tons per man" as of greater importance than "wages per day" and that permanent construction, both above and below ground, which is less expensive than temporary work with its high renewal and maintenance costs will in the future be regarded as preferable to the makeshift arrangements of the past.

The constantly decreasing number of young men who enter our mining schools and the pitifully small percentage of graduates entering the coal-mining industry is a true index of the reluctance, amounting almost to intolerance, with which coal-mine officials usually receive the infusion of trained brains. This is in marked contrast to the automobile, telephone, utility, railroad and other industries which not only welcome such men, but employ scouts to visit the technical schools and pick the best.

Coal mining is fundamentally and inherently a



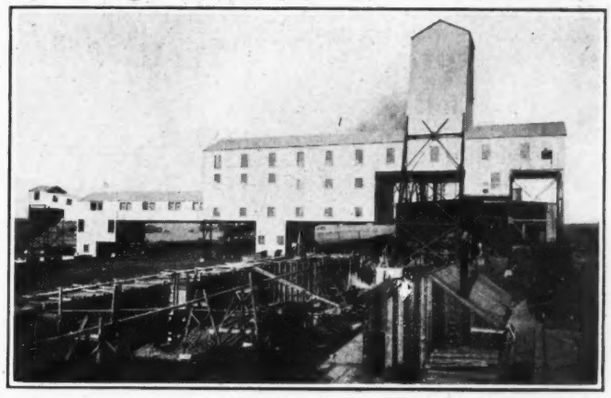
Wood Must Go from Shaft Bottoms

The mine in which this photograph was taken was recently completely rehabilitated. The track shown provides storage for empty cars at the bottom of the hoisting shaft. The heavy concrete-and-steel construction indicates one of a number of changes needed to reconstruct an old plant.

science, and should be so considered. It requires a combination of engineering knowledge that no one man can fully absorb, for it is made up of structural, chemical, electrical and other branches of the profession to such a degree that individual knowledge becomes inadequate and organization alone will fill the requirements. To expect "factory" results from the management of a modern mine when the personnel is not made up of men trained in the technical, as well as the practical phases

The Mules Next of Kin, the Electric Locomotive

The cars are rarely chunked with coal in the modern mine, as is shown here, but roughly heaped up in the center being filled hurriedly by a shovel or conveyor. For this reason larger cars than ever are needed if tonnage is to be maintained. Some are using side boards to obtain the needed height.



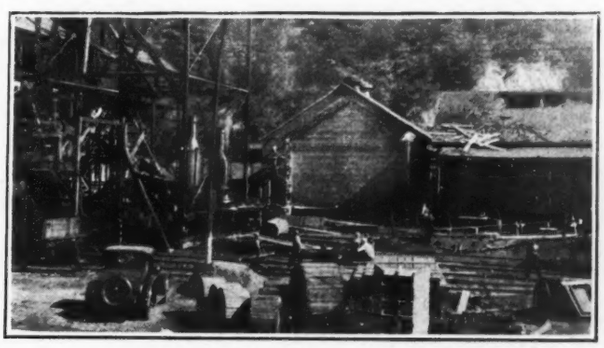
A Fine Plant, but Eight Men Handle Only 2,000 Tons Daily

We move along rapidly and it seems difficult to convince anyone that what was standard a few years ago is obsolescent today, but so it is and, in financing, that fact should be remembered.

of the work, is just as futile as to hope for good results if engineers were not used in the construction and operation of a giant generating station, a railroad, or—to be specific—in the management of such concerns as the General Electric or Westinghouse companies.

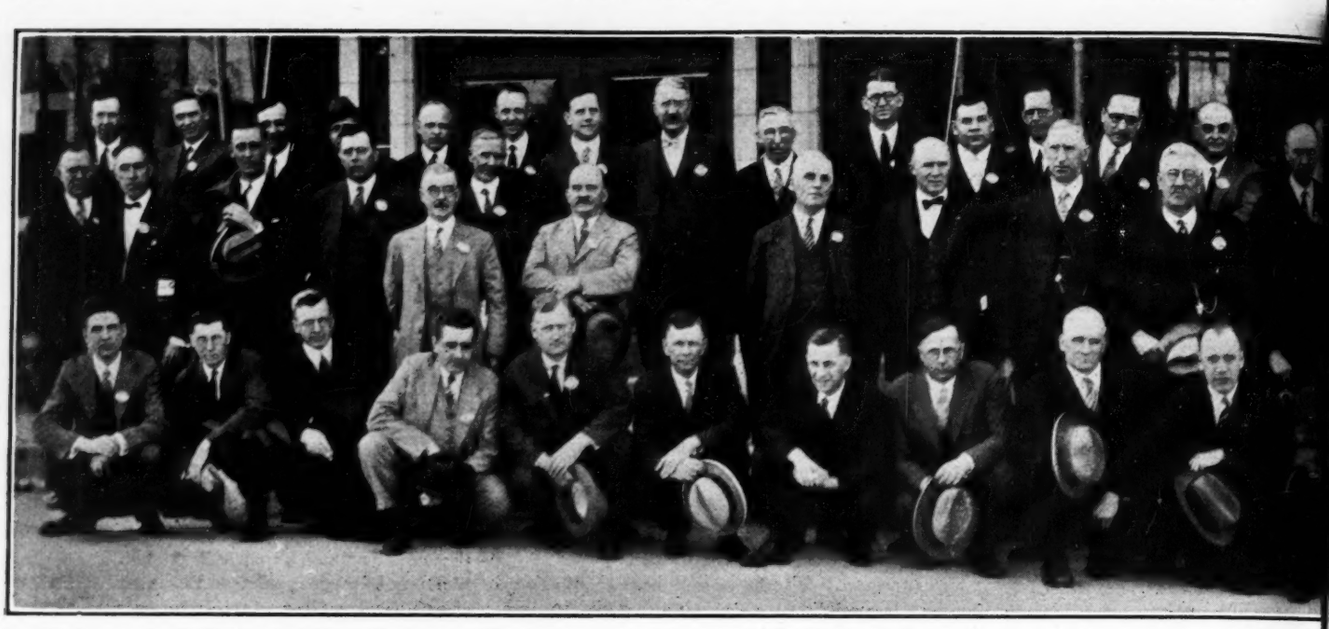
The coal-mine operator deals in thousands of tons per day; the factory, the ordinary metal mine, the mill or the usual plant anywhere in hundreds of tons or even pounds. The coal miner does his work underground, in the dark, in the presence of unknown forces in roof pressure, water, gas, and the like, whereas the factory works to definite formulas in the daylight and on the surface of the ground. How much more necessary, therefore, is engineering in coal mining than in any other line of human activity? Thus far American operators have led the world in output per man, in lower production costs and in speed of development—all with practically no engineering at the average mine—but at what cost in extraction, in wrecked corporations, in overproduction, in tangled wage scales and in periodic chaos!

Reconstruction and reorganization of bituminous-coal mining will come either voluntarily step by step, with each individual company or by way of the more unhappy and violent method of bankruptcy. The choice lies with the coal operator and his banker. The interests of these two are mutual. The banker's vision and courage in many other phases of mining has been so clear and admirable that we may now quite logically look ahead with confidence to the dawn of a better day in the coal industry.



Reconstructing a Tipple, Time Had Made Obsolete

Many companies are rebuilding their surface plants, coal-handling and preparation equipment, thereby saving in labor and producing a better prepared coal. The reconstruction job here shown has since effected a saving per year equivalent to about 25 per cent on the investment.



Mine Inspectors' Institute in Pittsburgh, Plans

Uniform Hoisting Signals and Elim Mines Initiates Terrific Explosion in Shoot Clear Across Valley—Company

From a Staff

PRESSING necessity for cheaper coal with resultant trials of new mining methods has brought fresh problems to mine inspectors and safety engineers. This was apparent at the annual meeting of the Mine Inspectors' Institute of America held in Pittsburgh, Pa., May 11, 12 and 13.

The registered attendance of over 120 men and the large program alike indicate that the institute is maintaining the progress started last year. Old timers say that it was the best meeting since the days of 1912 to 1916. Twenty-seven new members were admitted during the Pittsburgh sessions. Changes made to the constitution broadened the policies of the institute and made provision for more publicity.

Frank Hillman, safety inspector of the Woodward Iron Co., Mulga, Ala., and president of the institute, acted as chairman at all the meetings. The first two days were occupied by business sessions but the entire third day was devoted to an inspection of the U. S. Bureau of Mines experiment station and to a demonstration at the Experimental Mine.

SINGLE ENTRIES DREW NO COMMENT

On the first day, the members discussed single entries, explosive regulations and sprinkling. The paper "New Methods of Mining Single Entries in Their Development," by James Dalrymple, chief inspector of mines, Denver, Colo., drew forth many comments. As might have been expected, Mr. Dalrymple strongly opposes the driving of a single entry, his ideas being summed up in the following dictum, "The single entry is as old as mining and is as inefficient as it is old. Its inefficiency and dangers increase with its age."

It was understood that the term "entry" as used in the paper meant what is more commonly termed a room, scraperway, conveyorway, or the like. Although no one disagreed with the paper, the institute took no specific action to condemn the driving of long single rooms. Some interpreted this as a sign that many of the inspectors feel that the method is sure to come and that the ventilation problem must be solved accordingly.

A paper entitled "Regulations for the Use of Permissible Explosives," by Dr. J. J. Rutledge of Maryland, was constructively criticized. P. J. Callaghan, state mine inspector, Bridgeville, Pa., favored the elimination of the safety fuse, with the comment that electric firing is almost the exclusive practice in his section. He questioned the advisability of the practice of bringing out left-over explosive at the end of each shift.

Richard Maize called attention to the fact that the Pennsylvania law requires only a 5-min. wait before examination of a misfire, instead of one-half hour as recommended by Dr. Rutledge. Mr. Maize thinks that 5-min. is enough and inquired if a rule calling for short-circuiting of the electric wires at the firing machine or battery would not be a measure that would increase safety.

C. A. McDowell, manager, industrial relations department, Davis Coal & Coke Co., Thomas, W. Va., said that in the mines of this corporation, the men place their explosives with checks in the separate compartments that are provided in cars specially built for that purpose and destined each for its respective section of the coal mine.

WATER GOOD BUT DUST BETTER

A paper by Ed. Flynn, safety inspector of the Tennessee Coal, Iron & R.R. Co., Pratt City, Ala., on "Complete Watering System for Dust Control in Coal Mines" proved a disappointment to many. They were primed for an argument, but Mr. Flynn opened his remarks by stating, in effect, "I have no quarrel with the advocates of rock dusting." He claimed, however, that it was possible to fight the dangers of coal dust by water, and at the same time said that he believed

Members, Mine Inspectors' Institute of America

# of America, Assembled Safety Regulations

ination of Fuse Sought—Bureau of Mouth of Experimental Mine—Flames Seeks to Sack Dust from Cutter Bits

Correspondent

that rock dust will do all in the way of explosion prevention that its advocates claim.

He insists that as yet dusting has not solved the problem at the face and that water on the cutter bar of a machine is a necessity. This, he said, requires a permanent piping system which can readily be utilized for sprinkling the major part of the mine. He said that rock dust should be used on the main slopes and in like places which are on the intake air. Answering a question regarding the cost of watering a mine Mr. Flynn said that in a certain mine covering 2,750 acres and containing 575 working places the sprinkling force consists of fourteen men in summer and twenty in winter.

On the evening of May 11, the institute was entertained at the factory of the Mine Safety Appliances Co., where the employees were held overtime to demonstrate the steps in the manufacture of mine-safety and first-aid products. Parts of the new McCaa oxygen-breathing apparatus were seen in the process of manufacture and the new continuous methane recorder was on exhibition. After a dinner on the top floor of the factory, professional talent entertained the members.

At the opening of the meeting on Wednesday two resolutions pertaining to safety were adopted. The first offered by V. E. Sullivan, of West Virginia, called for a uniform code of signals in all states where men are hoisted. The standardization committee was directed to prepare a report on this subject recommending a code to be submitted to next year's meeting. The second resolution by F. W. Cunningham, of Pennsylvania, declared that the use of fuse for blasting should be prohibited at all coal mines.

S. S. Hall, of Pennsylvania, read a paper on "Falls of Roof and Coal." He said that more serious accidents are chargeable to falls than to any other cause and that 75 per cent of these falls are due to disobedience, carelessness, and bad practices. His deductions indicate that the highest accident rate from falls is among men of 15 years' or more experience.

Mr. Dalrymple said that the efficiency of the individual must be increased before material reductions can be made in casualties. Mr. Maize cited a case of a company in his district which reduced accidents 80 per cent by strict supervision. Though education of the individual was not belittled, the consensus of opinion seemed to be that proper supervision and direction were the most important factors in reducing this class of accidents.

A paper by Edward Steidle reviewed the "Present

Officers of the Institute During the Past Official Year and the Pittsburgh Meeting

From left to right; Frank Hillman, W. H. Jones, Dr. J. J. Rutledge, G. B. Butterfield, J. H. Griftner, E. J. Hoey and William Boncer

Mine Inspectors' Institute's New Leader

During the coming year E. J. Hoey will direct the business of the Institute as President. Mr. Hoey is district mine inspector, at Christopher, Ill.

Status of Rock Dusting in the United States." Five per cent of the bituminous mines, representing 12 per cent of the bituminous production of the United States is now dusted. An aggregate of 1,200 miles of entry has been treated. He emphasized the fact that rock dusting is only an additional safety measure or a line of second defense and that no other safety practices should be relaxed after dusting. He claims that the cost will not exceed 1c. per ton and that actual figures per ton from a number of mines run from 0.2c. to 0.9c.

Captain Steidle took occasion to criticize severely Harry Phythyon's book, "The Rock Dust Remedy." Mr. Phythyon was not in the meeting to defend his views but was in attendance at the banquet in the evening.

Dust Cannot Hold Enough Water

J. W. Paul, chief mining engineer, U. S. Bureau of Mines, called attention to the fact that tests have indicated that the dust of certain coals will not hold enough moisture to prevent propagation.

It was said that the Consumers Mining Co. is working on a plan to take coal dust from the cutting machine at the face by a suction fan and to sack it at that point.

Self-rescuers were described in a paper by George H. Deike. He stated that today protection can be afforded by suitable gas masks against every known industrial gas. The explosion at Overton No. 2 mine was cited as an example of what can be done where self-rescuers are available. At this disaster many lives were saved by the use of these devices. Although the self-rescuers are rated as of ½-hr. capacity, tests have indicated limits of from 1½ to 5½ hours.

E. J. Gleim, substituting for L. C. Ilsley, of the Bureau of Mines, gave an illustrated talk on "Permissible Electrical Mining Equipment." Among the pictures of the latest approvals were the Jeffrey conveyor loader and shortwaloader, also the Ohio Brass Co.'s junction box for portable cable connections.

Officials Have High Fatality Rate

The last paper, by Dr. T. T. Reed and J. J. Forbes, "Comparative Fatality Rates" was read by Mr. Forbes. He prefaced his remarks by calling attention to a statement by R. N. Hosler that the percentage of fatalities among mine officials in Pennsylvania is as high as among the workmen. The paper dealt with an investigation to determine if, in the period from 1915 to 1925, there is any relation between the production per death and the production per man per day.

The individual curves for each state show little or no relation between these factors, but the summation curves for all states indicate that the two factors may be in some slight degree related. Since 1920 the production per man per day, has steadily increased and production per death has decreased.

Officers Were Elected

The following were elected officers for the coming year: President, E. J. Hoey, district mine inspector, Christopher, Ill..; first vice-president, William Boncer, chief of coal-mine inspection, Richmond, Va.; second vice-president, W. H. Jones, chief mine inspector, Lexington, Ky.; third vice-president, Nicholas Evans, district inspector, Johnstown, Pa.; secretary, G. B. Butterfield, general manager, The Associated Companies, Hartford, Conn.; assistant secretary, J. H. Griftner, chief inspector, The Associated Companies, Champaign, Ill.; treasurer, J. J. Rutledge, chief mine engineer, Baltimore, Md.; editor-in-chief, James T. Beard, senior associate editor, *Coal Age* (retired), Danbury, Conn.

On Wednesday evening the Bituminous Mine Inspectors Advisory Association of Pennsylvania tendered a banquet to those attending the institute. J. T. Thomas, of Johnstown, acted as toastmaster, introducing the speakers: S. A. Taylor, J. J. Walsh, E. A. Holbrook, A. C. Fieldner, James Ashton, R. N. Hosler and J. T. Ryan. The climax of the evening was an address by a representative of the mining department of Russia, which representative proved to be the national entertainer, Luke Barnett.

Thursday morning, members of the Institute visited the various laboratories of the Pittsburgh experiment station of the U. S. Bureau of Mines. Among the new items seen were the continuous carbon monoxide recorder, the approved McCaa oxygen-breathing apparatus and the Fleuss-Davis breathing equipment which is also approved. The latter apparatus, which is made in England, uses an impregnated coke in a bag as the carbon-dioxide absorbent. This apparatus is a few pounds lighter than the Gibbs or McCaa.

To those who in the afternoon went out to the experimental mine at Bruceton, J. W. Paul promised, "probably the most spectacular coal-dust explosion that has been set off at the mine." None were disappointed. Flames shot out across the valley and gave the opposite hillside the most severe scorching it has ever had. The flames set the grass on fire in a number of places at least 100 ft. beyond the fence near the top of the opposing hill, thus extending 600 ft. or more from the mine portal.

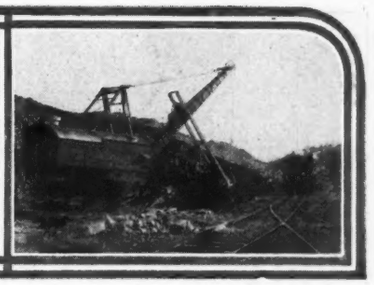
Coal Dust Ignited Near Portal

In the preparation for this explosion no gas was used. Two pounds of coal dust per foot of entry was distributed from the mouth of the mine to a point 400 ft. inside of it. The dust was ignited by a blown-out shot consisting of 4 lb. of black blasting powder fired from a cannon at a point 180 ft. from the mine entrance and pointing outby.

This demonstration was but one of a number made during the afternoon at Bruceton, but it served as a fitting climax convincing any who might be skeptical that a blownout shot of black powder will produce an explosion of coal dust without the aid of gas.

Charleston was selected for the annual meeting to be held next year.

News Of the Industry



Consumers' Stocks of Soft Coal Total 40,000,000 Tons on April 1; 26 Days' Supply if Evenly Divided

Bituminous coal stocks in the hands of consumers on April 1, 1926, totaled 40,000,000 tons according to the U. S. Bureau of Mines. This is slightly lower than at a corresponding period last year, but about midway between the stock figures of June 1 and Sept. 1, 1925. The trend since the beginning of the year has been gradually downward to more normal proportions. Consumption continues to be more than production, which, during February and March, ranged downward from 12,167,000 to 9,626,000 tons a week, indicating greater inroads upon stocks.

At the rate of consumption prevailing during February and March this year, the supply on April 1 was sufficient to last 26 days. This is 11 days less supply than in March a year ago, the nearest like date for which figures are available for comparison, but four days greater supply than on March 1, 1923. If no substitution for anthracite had been necessary, the supply on Feb. 1 would have been sufficient for 31 days, but at the actual rate of consumption prevailing during January, the supply was enough for 28 days. The average days' supply figure, while useful for comparison with figures for other stock report dates, is not indicative of the true situation in many localities and industries, as individual supplies range from little or no coal on hand to very large reserves.

Upper Lake Stocks Near Normal

There were, in addition to the tonnage in consumers' hands on April 1, about 2,900,000 tons of coal on the Lake Superior and Lake Michigan docks; slightly less than 200,000 tons stored by the producers at the mines or at points between the mines and market; and approximately 1,000,000 tons loaded in cars but unbilled at mines. The first of these items is lower, as is normal at the end of the coal year, and the other two items higher, than on Feb. 1.

Anthracite and Substitutes. — With the resumption of anthracite operations in February, retail dealers' stocks of anthracite have increased considerably since the preceding date of stock taking, Feb. 1. Retail stocks of bituminous coal on April 1, while lower than at the time of the previous stock report, have not declined to any unusual or abnormally low level. Surplus stocks of byproduct coke at merchant plants on April 1, despite the record-breaking production during the two-month period under discussion, were even below the record-breaking minimum of Feb. 1, 1926, amounting to only 57,000 tons. At the beginning of the anthracite suspension, in September, byproduct coke stocks were 832,000 tons.

Estimates of the total quantity of soft coal in the hands of commercial consumers are based on practically complete reports from byproduct coke plants and steel plants, railroads and utilities, together with reports from a selected list of other industrial consumers and coal dealers—nearly 5,000 in all. The estimate for April 1, 40,000,000 tons, is believed to be accurate within 5,000,000 tons. It does not include coal in householders' bins, for which no estimate is possible, nor does it include the tonnage of steamship fuel in reserve. The tonnage on hand on the Lake docks also is omitted from this estimate but is included under the heading "Bituminous Coal in Transit."

Reports from consumers together with some supplemental information indicate that the average rate of all consumption plus exports during February and March was around 12,200,000 tons of bituminous coal per week. This rather high rate of consumption was caused partly by the activity of the coal-using industries typified by the large production of pig iron in March and the record breaking output of byproduct coke, and in part by the continued demand for anthracite substitutes. The weather continued cold and although production of anthracite was resumed Feb. 18, it was well into March before hard coal reached householders in volume sufficient to check the purchases of soft coal by householders who normally do not use it.

Comparison of the days' supply held by the principal consuming classes on April 1, 1926, with those on varying dates in 1919 to 1926 reveals that the reserves in every class were lower on April 1 than on Feb. 1, 1926. The greatest change was for coal-gas plants, which had a week's less supply on the last date than they had two months previously. The decline in supply held by other classes of consumers amounted to from one to five days only.

Reserves of soft coal on April 1, in terms of days' supply, differed widely, as usual, from state to state. The best indicators for this purpose are returns from the general industrial concerns, other than byproduct coke and steel plants. They are the largest single group of coal users, both as to number and tonnage consumed, and, being widely distributed throughout the country, their stores of coal are a sensitive barometer of conditions in the coal market. New England on April 1, was carrying considerable stocks of coal, four of the six states averaging close to 60 days' supply, the average for the entire region being 51 days. The stocks in the northern peninsula of Michigan also were maintained at a high figure the highest in terms of days' supply for any section of the country. In New York State stocks averaged 53 days, 6 days less supply than on Feb. 1. Lower Michigan was carrying 41 days' supply and Colorado 57 days. The remaining states show reserves varying from 8 to 45 days' supply, except Oklahoma, which shows heavy reserves.

As is customary, the utilities carried larger reserves than any of the other groups of consumers. The coal-gas plants on April 1 had a supply sufficient to run them, on the average, for 60 days, and the electric central stations had a 46-days' supply.

Byproduct coke and steel plants had a smaller tonnage in reserve than on Feb. 1, 1926, the decreases being two days' supply for each group. Complete returns from these important manufacturing classes indicate stocks on hand at recent dates as shown in Table II.

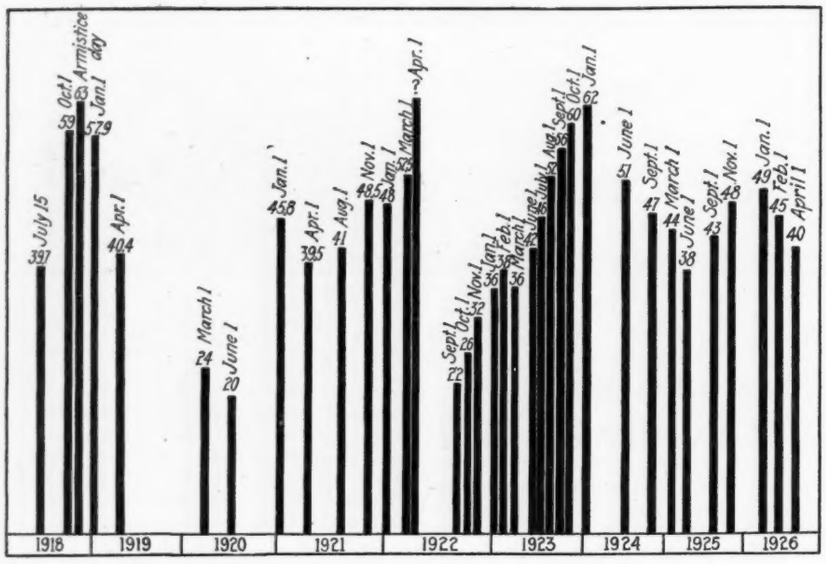
The total quantity of railroad fuel on hand April 1, according to information

Table I—Days' Supply of Bituminous Coal in Hands of Various Classes of Consumers in the United States, Jan. 1, 1919, to April 1, 1926*a*

(Figures represent number of days that supply would last at rate of consumption at time of stock-taking.

	Jan. 1, 1919	Mar. 1, 1920	Apr. 1, 1921	Mar. 1, 1922	Mar. 1, 1923	June 1, 1923	June 1, 1924	Mar. 1, 1925	June 1, 1925	Sept. 1, 1925	Feb. 1, 1926	Apr 1, 1926*b*
Byproduct coke plants	32	15	28	39	19	23	34	25	20	22	23	21
Steel plants	42	19	38	48	26	29	56	30	27	30	26	24
Other industrials	65	27	47	56	34	39	53	40	32	38	37	32
Coal-gas plants	81	31	66	82	58	75	88	78	68	67	67	60
Electric utilities	49	21	48	54	34	45	63	51	48	43	47	46
Coal dealers (bitum)	39	13	26	23	11	27	40	33	31	27	17	14
Railroads	32	11	24	42	16	21	50	35	32	28	25	23
Total bituminous	42	18	36	43	22	30	49	37	32	32	28	26

(*a*) These figures are based on incomplete data. (*b*) Calculated at average rate of consumption during February and March.



Total Commercial Stocks of Bituminous Coal, July 15, 1918—April 1, 1926

Figures represent millions of net tons and include coal in the hands of railroads, industrial consumers, public utilities and retail dealers. Coal for steamship fuel, on lake docks, in transit and in the bins of householders is not included.

received from the American Railway Association, was 9,090,000 tons, or approximately a 23-days' supply.

Coal brought to the surface, made ready for the market, but not yet delivered to a retail dealer or a consumer may be considered "in transit." The largest element in this mobile reserve is the coal in railroad cars, which, though never accurately measured, is known to run into millions of tons.

A few bituminous producers store coal at their mines. The quantity stored April 1 was small. From a list of 43 companies who have at some time in the past stored in quantity at the mines or at some intermediate point, the Bureau has received reports of only 199,000 tons so held on April 1, or 30,000 tons more than the revised figure for Feb. 1, 1926, the date of the last stock report. In March, 1923, these same companies had 808,000 tons on hand.

The total quantity of unbilled coal in cars at the mines was 1,006,000 tons on April 1, as against 760,000 tons on Feb. 1, 504,000 tons on Nov. 1, 1925, and 600,000 tons on March 1, a year ago.

Reports from all companies show stocks of 5,176,000 tons on the Lake Superior and Lake Michigan docks on Feb. 1, and 2,892,000 on April 1, compared with 5,160,000 tons on March 1, 1922; 1,700,000 tons on March 1, 1923; 7,806,000 tons on Jan. 1, 1924; 3,840,000 tons on March 1, 1925.

Table II—Coal Stocks at Byproduct Coke and Steel Plants

BYPRODUCT COKE PLANTS

	Days' Supply as at Mar. 1, 1925	Feb. 1, 1926	Apr. 1, 1926
Low volatile	23	24	24
High volatile	26	23	21
Average	25	23	21

STEEL PLANTS

	Days' Supply as at Mar. 1, 1925	Feb. 1, 1926	Apr. 1, 1926
Steam coal	36	36	30
Gas coal	26	21	21
Average	30	26	24

By April 1, the date covered by this report, anthracite production had been resumed for about six weeks. It was not possible to obtain reports from all retail dealers, but a selected group who have been reporting regularly for seven years are covered in Table III. Of these dealers, 812 handled bituminous coal and 587 had handled anthracite on preceding dates. It will be seen that stocks of anthracite, which on Feb. 1 were the lowest for any date in recent years, except possibly in September, 1922, have been greatly increased, in fact more than trebled during the sixty-day period since the preceding stock report. Bituminous retail stocks, on the other hand, decreased nearly 400,000 tons during the two months, or slightly less than the increased tonnage of anthracite in the retail yards.

Table III—Coal in Yards of a Selected List of Retail Coal Dealers

(In Net Tons)

Date	Anthracite *a*	Bituminous *b*	Total
Jan. 1, 1919	958,225	1,499,737	2,457,962
March 1, 1920	737,139	631,431	1,368,570
April 1, 1921	1,126,973	1,007,638	2,134,611
March 1, 1922	1,074,628	1,089,871	2,164,499
March 1, 1923	272,378	763,525	1,035,903
June 1, 1923	643,780	1,087,880	1,731,660
June 1, 1924	1,071,894	1,035,485	2,107,379
March 1, 1925	1,150,534	1,069,352	2,219,886
June 1, 1925	1,221,840	980,947	2,202,787
Sept. 1, 1925	1,430,509	1,287,415	2,717,924
Feb. 1, 1926	200,737	1,278,972	1,479,709
April 1, 1926	625,959	898,924	1,524,883

a The number of dealers reporting their stocks of anthracite on each date was 587.

b The number of dealers reporting their stocks of bituminous coal on each date was 812.

A group of 21 byproduct coke plants supplying gas for city use reported only 51,000 tons of unsold coke on hand April 1, as against 246,000 on Jan. 1 and 87,000 tons on Feb. 1, 1926. The figure of 51,000 tons is the lowest one on record since October, 1923. Stocks of byproduct coke on other recent dates have been: March 1, 1922, 987,00 net tons; Jan. 1, 1923, 212,000 tons; Jan. 1, 1924, 772,000 tons; March 1, 1925, 606,000 tons.

Economy in Use of Fuel Stressed by Railway Men; Storage Not Practicable

Further fuel economies was the predominating thought among approximately 2,500 delegates at the eighteenth annual meeting of the International Railway Fuel Association, which opened a four days' session at Chicago, May 11. The program was filled with addresses and reports on fuel accounting, distribution and statistics, conservation and efficiencies in the consumption of fuel by the railroads.

Coal operators were prominent among the delegates. Thirty-one companies had placards in the "Coal Parlor" of the convention hall in the Hotel Sherman. W. H. Harris and Thomas Irwin, both of Chicago, were in charge of the coal division.

R. J. Elliott, purchasing agent of the Northern Pacific Ry., said that the railroads still buy and use about one-third of the 522,960,000 tons of bituminous coal produced annually, and that there is no indication of any great reduction of this consumption by reason of electrification, use of oil or other motive power, except purely local efforts in handling suburban traffic.

Storage of coal to equalize the fluctuations between the months of high and low demand is not considered practical because of the expense and inherent fire potentialities, according to the report of the association's standing committee on coal storage.

"The storage of coal," says this committee, "does not increase consumption, and so long as the available output of the mines is so far in excess of consumption, it is impracticable to equalize the monthly mine production by the storage of coal.

"Overproduction and excellent transportation produce keen competition with a resulting low price and a better quality of coal."

D. H. Pape, assistant to the executive secretary of the National Coal Association, suggested concerted buying of coal on an annual budget plan by private consumers, industrial users and railroads, in order to stabilize the mining industry and eliminate peaks and low production periods.

Railroad Fuel Costs Advance Slightly in March

Average cost of coal used by Class 1 railroads in locomotives in transportation train service during March was a little above the February figure, according to the Interstate Commerce Commission. The averages for the different districts are as follows: Eastern district, $2.72; Southern district, $2.22; Western district, $2.93; entire United States, $2.65.

These averages indicate an increase over February of 3c. per ton in the Eastern district; 1c. per ton in the Southern district; 2c. in the Western district, and 2c. for the whole United States. Compared with similar averages for March of 1925 there is a decrease of 14c. per ton in the Eastern district; 19c. in the Southern district; 18c. in the Western district, and 17c. for the whole country.

British Industry Nears Normal as Newspapers Reopen and Transport Service Resumes; Miners Still Out

The British labor situation is still grave. Although the general strike inaugurated at midnight May 3 was unconditionally called off by the Trades Union Congress on May 12, many men who went out in sympathy with the coal miners have not returned to work. In some cases employers refuse to discharge the volunteer workers who stepped into the breach. Peace apparently has been effected in the transport service through the signing of new agreements between the railways, city and interurban transportation systems and their men. Full-size newspapers also have reappeared.

The paralysis of coal production, however, continues. The government, in conformity with the promise made by Premier Baldwin, renewed its efforts at negotiating a new agreement in the coal fields as soon as the general strike order was recalled. Both owners and workers have asked for more time in which to consider the government proposals and the decision of the Miners' Federation will not be known until today.

Mr. Baldwin set out the government program in a letter to Evan Williams, representing the owners, and Herbert Smith, representing the miners. This program, made public in the House of Commons on Friday, provides:

(1) That steps shall be taken to put into practical effect the various recommendations for improving the organization and efficiency of the industry incorporated in the report of the Royal Coal Commission.

(2) That the government will grant an additional subsidy of £3,000,000 to be used in making up wage deficits during such period as may be necessary for the National Wages Board, with an independent chairman, to frame a national agreement which will govern the principles upon which district rates shall be ascertained and which will decide minimum percentages of base rates which must be paid.

(3) No reduction of subsistence rates below 45s. per week is to be made in the interim.

(4) That during this period there shall be a reduction in the minimum rates, other than subsistence wages, in all districts. The extent of the reductions is to be left to the negotiations set in motion by the government.

As the first steps in giving statutory effect to the Commission's recommendations, the government proposes to enact legislation on the amalgamations of undertakings (i.e., producing companies), a welfare levy on royalty owners, restriction of recruitment and the setting up of a wage board.

In the main, therefore, the government program is in accord with the memorandum submitted to the Trades Union Congress by Sir Herbert Samuel, chairman of the Coal Commission, as a basis for calling off the general strike. Sir Herbert, who appeared early last week in the rôle of peacemaker, proposed:

(1) That the coal subsidy be renewed for such reasonable time as might be required.

(2) That a national wage board, composed of representatives of the miners, mine owners and the public, with an independent chairman, be created and that this board revise the wage scales.

(3) That there be no revision of wages, however, without previous assurance that the reorganization of the coal industry recommended by the Commission would be executed.

(4) That a committee, with miner representation, be named by the government to prepare the legislative and executive measures necessary to effect a reconstruction of the coal industry.

Lord Reading, former Viceroy of India, may be chosen neutral chairman of the suggested advisory committee for reorganizing the mining industry. Lord Reading has been in the Peers Gallery on every occasion on which the coal dispute was discussed and he was in conference with Premier Baldwin prior to the Cabinet meeting May 13, at which the whole situation was reviewed.

The lockout policy started by some British employers when the strikers applied for their old positions naturally has provoked considerable bitterness. The general dislocation of the industrial life of the nation has been so great that reports reaching this side of the water have given no clear measure of the extent of this lockout movement. When questioned as to his attitude on the subject, Premier Baldwin reiterated his pledge that those who had aided the government in the crisis should not suffer for their service. At the same time he expressed disapproval of retaliatory measures on the part of employers.

"I will not," he told the Commons on Thursday, "countenance any attempt upon the part of any employers to use the present occasion to get reductions in wages below those in force before the strike began, or to get an increase in hours. Last night I learned that a certain large group of employers was unwilling to meet the union concerned. I lost no time in broadcasting that I thought the essential associations of the employers and the unions concerned should meet immediately and discuss the many difficulties that arise in getting the men back to work."

Labor leaders in Parliament have protested vigorously against employers who decline to let the dead past bury

Keystone View Co.

Sir Herbert L. Samuel

Chairman of Royal Commission, whose memorandum to the Trades Union Congress last week was the basis for calling off the general strike.

Ewing Galloway.

Miners' Wives Pick Coal from Big Colliery Waste Heap

Near Birmingham, Warwickshire, England. Apparently the men are leaving the work to the women, possibly arguing that it is a somewhat embarrassing situation being seen getting coal for themselves while denying the right of others either to get coal or to employ others to get it. Their answer probably would be, "One must live."

its dead and have hurled accusations of a campaign on the part of certain employers to smash the unions. To these charges the Premier has retorted that he would not countenance any such campaign. This particular flare-up arose out of the reported position taken by some of the railways. Later, however, through the good offices of the Premier, a settlement was effected.

By the terms of this settlement the railway unions involved admit that they committed a wrongful act in calling the strike and agree that they will not again instruct their members to walk out without previous negotiations. The unions promise no protection to members who engage in unauthorized strikes and exclude from the benefits of the agreement persons guilty of violence or intimidation. They further covenant that they will not encourage supervisory employees to take part in any strike. The settlement does not touch wages or working conditions. Neither does it provide that the reinstatement of the strikers waives any legal claim for damages which the railways may have against the men who walked out.

More Railroads Seek Bids

The Atlantic Coast Line will open bids on May 26 for its fuel requirements for the present year at its main offices at Wilmington, N. C. The exact tonnage to be let has not been learned. The bids provide for mine-run and 6-in. resultant, according to reports.

The Pere Marquette railroad will open bids at its main offices in Detroit on May 20 for its fuel business, which will consist of from 55,000 to 70,000 tons of coal for shipment into Canadian points and from 775,000 to 825,000 tons for use on its lines in the United States. Most of the coal to be shipped to points in this country will be delivered at Toledo and points in Michigan, it is reported. The company buys its coal on a basis of mine-run and 6-in. resultant prepared at the mines, and figures are submitted on this basis.

Sealed proposals will be opened by the Supt. of Lighthouses, Baltimore, Md., 2 p.m., May 27, 1926, for furnishing anthracite No. 3 coal and bituminous steaming coal for stations and vessels, 5th Lighthouse District, as required during the fiscal year ending June 30, 1927. Information upon application.

R. G. Archibald, state purchasing agent, Boise, Idaho, is preparing proposals for bids on the state's coal for the winter of 1926 and 1927. Approximately 15,000 tons will be required. Bids will be opened by Mr. Archibald on June 10.

Kansas Gas Blast Kills Four

Four miners were killed by a gas explosion at the Cigaret mine of the Lightning Creek Coal Co., Cherokee, Kans., May 14. James Jamison and George Hollis, top workers, were crushed under the tipple, which was wrecked by the explosion, and Hallie Jamison and Crockett Jamison, sons of James Jamison, met death underground.

Keystone View Co.

A. J. Cook

The secretary of the British Miners' Federation is frequently referred to as "Emperor" Cook, as he speaks his mind in no uncertain terms on labor policies.

Union Row Brings Suspension Of District President

Dissension among officials of District 21 (Arkansas and Oklahoma), United Mine Workers, culminated May 10 in the suspension of William Dalrymple as president by the district executive board, meeting at Muskogee, Okla. The vote was five to two. A hearing on secret charges will be held in Muskogee this week before the board.

Marine Corps Wants Coal

Bids will be received for coal requirements for the U. S. Marine Corps on May 27 at the office of the Quartermaster, Room 3207 Navy Building, Washington, D. C. Tenders are wanted on the following items: 29,000 tons of mine-run low-volatile bituminous steaming coal; 18,500 tons 2x4-in. semi-bituminous coal; 5,000 tons Pulaski (Va.) anthracite stove coal, and 4,000 tons of mine-run low-volatile semi-bituminous.

Denies Exclusive Right To Label Coal

Judge Foster Symes of the U. S. Court in Denver, Colo., has just released his decision denying an injunction to the Victor American Fuel Co., which filed a complaint a year ago against several coal companies in Colorado in connection with the labeling of coal. In its complaint the Victor American company alleged, first, that it had the exclusive right to label coal by virtue of copyright and, second, an infringement upon the label and the labeling of coal by their competitors. Judge Symes held that the complainant did not have a right to monopolize the labeling of coal and that there was no infringement upon the labeling of coal as alleged in the complaint.

Pittsburgh Non-Union Mines Have Another Recruit

The Clinton Block Coal Co. has opened its mine at Imperial, Pa., on the 1917 scale. This adds one more mine in the Pittsburgh district to the list of non-union operations, which are in excess of the remaining union operations. About 50 men went to work in the mine. One of the officials of this company is B. H. Canon, who was chairman of the executive committee of the Pittsburgh Coal Producers' Association at the time it dissolved.

The Lowber Gas Coal Co., which operates a mine near Fayette City, Pa., has posted proclamations in various places in Fayette City inviting its former employees to return to work on the 1917 scale. No date is given when operations will be started.

The Peters Creek Gas Coal Co., operating the Piney Fork mine, near Finleyville, Pa., has closed down. The mine has been operating on the Jacksonville scale. According to a report in Pittsburgh, the management asked the men to return to work on the 1917 scale and about 20 responded. Reopening was thereupon deferred for the time being. The Braznell Brothers are the heads of this company.

Two more strikes are on at mines in the Pittsburgh district which had been operating on the Jacksonville scale. In each case the reason given was operating other mines of the companies on the lower wage rate.

Close to 500 men are reported out at the Charleroi mine of the Youghiogheny & Ohio Coal Co. This company recently started its mine at Wyano, Pa., on the 1917 scale, although the location of the mine is generally considered to be in the non-union district.

A strike also was called at the Rich Hill mine of the McClane Mining Co. at Meadowlands.

Fuel Yard Bids Vary Widely

Bids on coal requirements of the Government Fuel Yards, U. S. Bureau of Mines, opened May 12, revealed a wide price range. On 22,000 gross tons of bituminous nut and slack the prices named ranged from $1.40 for ¾-in. to $2.30 for 1¼-in. For 148,000 tons of mine-run the lowest bid was $1.60 and the highest $2.56. Tenders on 1,800 tons of bituminous egg were from $1.85 to $4.46; Broad Top egg, $3.60 to $5.04. For 41,000 tons of mine-run, nut-and-slack or slack the bids ranged from $1.12 on nut-and-slack to $2.35 for mine-run. On 27,800 tons of mine-run, nut-and-slack or slack the quotations were from $1.12 to $2.25 for mine-run.

Coal Absorbs Trade Journal

Coal Trade Journal, beginning with this week's issue, will be merged with *Coal*. The Coal Publishing Corporation, publisher of *Coal*, according to an announcement May 12, has acquired ownership and control of the *Coal Trade Journal*, which was founded in 1869. R. C. Beadle becomes the publisher of the merged publications, and F. R. Wadleigh, editor of *Coal*, retains that post on the consolidated papers.

Coal Hearings Ended; Parker Bill Provides for Fact-Finding, Mediation And Emergency Distribution Control

By Sydney A. Hale

Washington, D. C., May 18.—Public hearings on coal legislation which have been going on intermittently before the House committee on interstate and foreign commerce since March 30, came to an end last Friday afternoon. Members of the committee now are considering what action they will take. Following an executive session this morning, it was intimated that the committee report might not be ready before next week.

In the opinion of many, however, the committee program is foreshadowed in a bill introduced in the House yesterday by Chairman James S. Parker. This bill, setting up fact-finding, mediation and emergency distribution control, follows the recommendations of Herbert Hoover, Secretary of Commerce, who appeared before the committee on May 14. In a sense, therefore, the Parker bill may be said to embody the ideas of the administration leaders on coal legislation. Its author hopes to see it enacted into a law before Congress adjourns.

The new bill makes the Bureau of Mines the coal fact-finding agency and compels the industry to furnish information to the Bureau. Refusal to do that would subject the offender to the danger of fine or imprisonment. In the event a labor dispute threatens production, the President may appoint mediators or direct the Secretary of Labor to endeavor to effect a settlement of the controversy. The Secretary of Labor may encourage arbitration, but no attempt is made to compel arbitration.

The bill also empowers the President to declare a state of emergency whenever labor disturbances or threatened labor disturbances menace the coal supply. If the menace becomes an actuality, the President may revive the Federal Fuel Distributor Act of 1922 and have the Federal Fuel Distributor co-operate with the Interstate Commerce Commission in controlling distribution.

Seizure Provision Unlikely

The likelihood that Chairman James S. Parker and his fellow committeemen will go further and seek to authorize government seizure and operation of mines during times of emergency is not strong. Such a provision was stricken from the Copeland bill when the Senate committee on education and labor reported out the New Yorker's measure last week. Neither the operators nor the miners favor such a proposal and it has found little support from most of the other witnesses who have appeared before the House committee.

Concluding his testimony on May 13, Walter Gordon Merritt, general counsel for the Anthracite Operators' Conference, stressed the fact that the power to regulate interstate commerce was subject to the other provisions of the Constitution and that Congress could not do indirectly what it was barred from doing directly. The Federal Fuel Distributor act, he felt, was of doubtful validity. Where transportation was adequate, Congress could not regulate coal by controlling transportation facilities. Neither could it seize coal for private purposes.

"Do you say," demanded Congressman Newton (Minnesota), "that Congress has no power to keep the wheels of industry moving?"

"There is no such power, in my opinion."

"I'd like to take a chance on it," retorted Mr. Newton.

Summarizing his remarks on publicity, Mr. Merritt pointed out that the industry already furnished voluminous reports on valuation, prices, profits, investment, expenses, depletion, insurance and taxes to the Bureau of Internal Revenue; data on employees, occupations and wages to the Department of Labor; detailed tonnage and realization reports to the Bureau of Mines, and various reports on operations, labor, earnings, prices and wages to the State of Pennsylvania. If Congress insisted upon fact-finding, he asked that it should not add to the burdens of reporting but arrange for duplicates of reports already filed.

Representative Dennison (Illinois) wanted to know whether the operators would object to making public their reports to the Treasury Department. Some producers, was the reply, would have very strong objections. Some operators, he added later, might carry any law passed to the Supreme Court. But fact-finding, he reiterated, would not cure the ills of the industry.

Competition Public's Protection

Competition from other fuels, said Mr. Merritt, was the best public protection against oppression. If operators were allowed full freedom to cooperate in production and distribution, they could save the public money—particularly in distribution—and fix responsibility for quality and price. Some operators think the rate relationships between bituminous and anthracite prejudicial to the latter and will endeavor to force readjustments, particularly on the steam sizes.

Mr. Merritt indorsed the recommendation of the Coal Commission that there be no fixed expiration for wage agreements, but that either party wishing a change in the rates and conditions give ninety days' notice. If at the end of thirty days no agreement had been reached, a Presidential board would have sixty days in which to study the question and make recommendations. Full freedom of action should be reserved to the workers at the expiration of the ninety-day period; not because the operators want it, he said, "but because the mine workers want it and are entitled to it."

Edgar L. Wallace, American Federation of Labor, centered his attack upon the mediation proposals. Any attempt to set up such agencies, he said, will only interfere with settlements within the industry. Men cannot compromise their differences or work in the spirit of collective bargaining when there is an adjudication board on the horizon. "Is it in the interests of the country that differences between the operators and the miners shall be settled by an outside party?" he asked. There was no general strike in the bituminous coal industry between 1897 and 1919; there would have been no strike in 1919, he declared, had it not been for government war-time intervention.

Secretary Hoover

Outside mediation, he contended, only increases the bitterness between capital and labor. Each side tries to make out a case by attacking the other and in time comes to believe "the facts" set up in argument, thus making real cooperation impossible. If the government fixes wages, it must also fix profits; because of varying costs, it would be compelled to fix such prices upon a basis which would yield the high-cost mines a profit.

Major legislative interest in the coal industry, stated Mr. Hoover in his testimony Friday, centers around the problem of labor relations. Given continuous production, the public is amply protected in prices by competitive processes. Transportation no longer looms up as an interrupting factor. The anthracite industry already has taken the first steps in settling its labor problems for a term of years. If the unionized section of the bituminous industry "could set up its own mediation board in the same terms as the anthracite industry, I believe Congress would be well justified in suspending any legislative action."

"If, however, there are to be periodic interruptions to bituminous mining, then outside mediation will be necessary. Most coal suspensions have been brought to an end sooner or later by such mediation, said Mr. Hoover. Power to appoint mediation boards, therefore, should be lodged with the President. The board, however, should not be a permanent agency, "as it is best to bring new minds and new men on the scene in such emergencies." These men cannot function without the basic facts on production, distribution, stocks, consumption, wages and average prices. "If the industry could

furnish these facts regularly and reliably of its own volition, it would be better that it do so than to put the government to the expense."

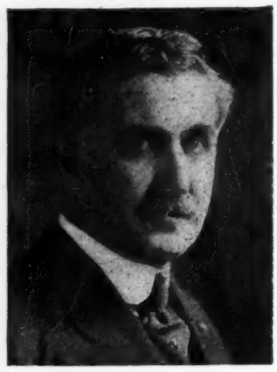
Where mediation fails and the suspension is widespread, some provision must be made for fueling essential services. "Thus it seems to me there are three things to be considered by the committee at the present time: An emergency mediation board, emergency authority to the Interstate Commerce Commission in coal distribution, and, in failure of provision by the industry, a more effective service as to primary facts. This is not regulatory legislation—and would come into action only in failure to maintain production."

The measures discussed before the committee, continued Mr. Hoover, deal only with symptoms of much more deep-seated diseases. The fundamental ills of the bituminous industry center around two main causes—too many mines and the seasonal character of the business. "The net result of all this is that we have part-time operation of too many mines and the final consequence that most workers, especially in the commercial mines, are only employed part time. While the daily wage is usually very high, it does not for some fraction of their number constitute even a decent annual living. The bituminous industry is in long view a losing business in the periods between famines and no unprofitable industry can give satisfaction either to consumer, worker or operator. From all these causes arise most of our labor friction."

Stabilizing Influences at Work

Mr. Hoover, however, saw certain forces at work remedying some of the fundamental ills. War stimulation has passed. Car shortages have disappeared. "The annual demand for coal will increase despite constant improvement in methods of fuel consumption. Oil and other substitutes are not likely to displace coal in so relatively large proportion in the future." Growth of public utilities and byproduct coke plants will help to stabilize production. Storage by large consumers also will help. Sharp competition has tended to a permanent closing of some of the high-cost mines, although its effects have been somewhat obscured by expansion in non-union areas. Some consolidations have been made. There has, in a broad sense, been steady improvement in methods and equipment.

"The various forces in motion are on balance making for greater stability in the industry—although obscured by cross-currents. I do not believe its fundamental difficulties can be corrected by regulatory legislation. There is no parallel in a competitive industry such as this with the railways or public utilities, which occupy a semi-monopoly of some area or market. Regulation of prices, profits, the right to produce or wages would not secure cheaper coal nor would it solve the major questions of labor relations—it would result in a score of worse ills. I dismiss government ownership and operation as a calamity to workers, consumers and government. What we must hope for is a greater vision of leadership in the industry to the correction of its own difficulties."



George Otis Smith

The claim of Philip Murray, international vice-president, United Mine Workers, that the term and rates embodied in the Jacksonville agreement had been suggested by the government (*Coal Age*, April 22, 1926; p. 577) was denied by Mr. Hoover. Answering a question of Congressman Merritt (Connecticut), the Secretary of Commerce said:

"So far as I am aware, no suggestion was ever made as to the term of the contract. Both Mr. Davis, Secretary of Labor, and myself urged the operators and miners to convene at Jacksonville. The Jacksonville conference was the sequence of a provision in their former agreement. Difficulty arose as to whether the operators would attend that conference, and Mr. Davis and I both devoted ourselves to urging that they should get together, in the hope that they would be able to settle their difficulties without a lockout or strike. We made no suggestion, or at least so far as I am aware, no suggestion was ever made as to the term of the contract or the rate of wages."

"Has the result of that agreement, such as they did make, been to throw a large part of the business into the non-union fields?" asked Mr. Merritt.

Non-Union Output Helped

"I think the result has been to increase the productivity in the non-union fields. I think that at least is the superficial appearance. You are dealing there with a hypothetical question. Assuming that the wage rate under the Jacksonville agreement had been 25 or 30 per cent less, it is probable that the non-union fields would have decreased their wages to some point 20 per cent below the standard, and the same effect would have taken place. So I do not believe that any one can say it is a certainty that the increase in the non-union fields would not have taken place if the Jacksonville agreement had not been fixed at such a rate."

The bituminous industry, he told Congressman Hoch (Kansas), was deficient in vital statistics on stocks and consumption. Such data would have a stabilizing influence. Emergency government operation, he said in answer to questions by Congressman Lea (California), would not cure the situation and would lead to great economic loss. "Most of our vital industries have managed to find a solution to the problem of continuous production and we practically forget their existence. I have never despaired that the bituminous industry also will find an answer."

The picture of conditions presented by the Coal Commission report, said Dr. Smith, is still a true one, but it is incomplete. What is needed is continuous, not sporadic, fact-finding. Justice to the public and to all parties in the industry can best come "and is most likely to come if and when the facts are known." Dr. Smith did not agree with those who contended that fact-finding would put an enormous financial burden on the industry and on the government, but "whatever the facts cost, the results will be well worth it."

Dr. Smith reiterated his opposition to government operation of the coal mines, but was as vigorous in denying that the government had no jurisdiction over the coal business. "Neither unregulated private operation nor inefficient government operation can be regarded as safe and economic." If we can regulate a public utility supplying energy in the form of gas or electric current, why may not coal, which supplies energy in a solid form, also be regulated? Regulation of public utilities has had no blighting effects upon efficiency or upon earnings.

Wants Labor Trust Controlled

"The real issue as I see it is the sovereignty of the American people in relation to those who own coal mines or work in coal mines. Is the people's right to an uninterrupted supply the dominant right? We have outlawed combinations of capital attempting restraint of trade or even control of prices and with public opinion strengthened by a full knowledge of the facts. I would like to see legalized such combinations of capital as intend to promote trade and lower prices, as larger and stronger companies surely can. But I wish also to see brought under legal control any countrywide combination of labor which has the declared purpose of enforcing its own decrees by creating public distress.

"Fact-finding is not the cure, but is the route toward betterment of the coal industry for all concerned. Private business depends upon public opinion and well-informed public opinion is both more effective and more just. I urge fact-finding as promising the best argument for the continuation of private initiative—as proved in the public regulated public utilities."

Ira C. Cochran, commissioner, American Wholesale Coal Association, the last witness heard, after analyzing the functions of the wholesaler, pointed to the various service orders issued by the Interstate Commerce Commission as evidence that provision already had been made for emergency distribution control. Compulsory fact-finding would throw a great and costly burden upon the coal man which would be included in the price of his product without giving the public any compensating advantage. "We believe," he concluded, "that the wholesale branch of the coal industry is functioning effectually and economically and we are unable to suggest any regulation that would further serve the public interest."

Urge Self-Government, Higher Efficiency And Less Waste in Business

Self-government in businss, but a self-government that recognized the social obligations of industry, was the keynote of the fourteenth annual convention of the Chamber of Commerce of the United States, held at the headquarters of the organization in Washington, D. C., May 10-13. "There is great hope," declared Herbert Hoover, Secretary of Commerce, at the annual dinner of the Chamber, "that America is finding herself upon the road to a solution of the greatest of all her problems—the method by which social satisfaction is to be attained with the preservation of private industry, or initiative, and a full opportunity for the development of the individual."

These newer ideals also received the attention of Governor Albert C. Ritchie of Maryland, who pointed out that business was no longer concerning itself solely with profits but was beginning to ask "whether the consumer is getting a square deal," whether distribution costs were out of line, whether concentration of industrial power and of wealth is going too far. "And when business once asks these questions and admits the need of an answer, I believe it can give it better than government can."

Another phase of the more advanced industrial thinking was elaborated upon by P. W. Litchfield, president, Goodyear Tire & Rubber Co., who took the position that wages should be the last to feel the force of business depression. "It used to be thought," he said, "that the first thing to cut when profits began to shrink was wages. It is now recognized that this condition should be met by increased efficiency, elimination of waste, the cutting down of overheads in production and distribution, and an attempt to maintain wages, because a general cutting down of wages curtails the demand for the finished products of industry, the demand for which is the very life-blood of prosperity."

Individualism Paramount

Business decays and civilization falters, asserted Julius H. Barnes, president, Barnes-Ames Co., when industry becomes the prey of oppressive governments and favoritism is substituted for equality of opportunity. This has been the history of the world from the hazy days of the Sumerian empire down through the dark years of the Middle Ages. Prosperity and society rest upon the possession of natural resources, the habits of industry and a stable and sound government. So long as America retains efficiency in its habits of industry and a sound government based upon the philosophy of individualism it can continue to enjoy the fruits of its heritage of natural wealth.

The problems peculiar to coal came up for consideration twice. The first time was when Walter Barnum, president, Pacific Coast Co., discussed the situation before the group meeting of the division of natural resources. At the conclusion of this address, in which Mr. Barnum insisted that the coal industry would and could function best in the national interest if left unhampered by government regulation, the group meeting adopted the following resolution:

"*Whereas,* Some citizens are making an increasing effort to persuade the federal government to inject itself into the business affairs of private industry, and

"*Whereas,* Proposed legislation now before Congress affecting the coal industry must mean, if enacted and sustained, the ultimate regulation and control of all branches of that industry, and

"*Whereas,* Such legislation would undo an improving situation by making it possible for either party to labor disputes to appeal to a political tribunal and would have a tendency to bring about conditions similar to those in Great Britain today, conditions directly traceable to governmental interference and continued appeal to the court of politics; therefore, be it

"*Resolved,* That the natural resources production division of the Chamber of Commerce of the United States hereby asserts its unalterable opposition. to and urges the Chamber to oppose legislation directed toward government interference in private business, whether it be coal or otherwise."

Oppose Coal Control

When the resolutions committee of the Chamber had finished its consideration of the proposal, the resolution reported to the Chamber and adopted by it read as follows:

"Regulation and control of the coal industry are proposed in divers ways by bills which are pending before Congress. We therefore consider it appropriate to reiterate the position of the Chamber of Commerce of the United States in opposition to proposals which have for their object the control of industries by governmental agencies."

According to Mr. Barnum, there is no more "coal problem" than there is the problem of obtaining a supply of other necessaries of life. Relatively and actually the coal industry can be proud of its record and there is nothing in proposals for government interference which justify a belief that such interference could improve the situation. Opposition of the industry to fact-finding as a form of regulation "is based solely on its compulsory feature and on the fact that no man can tell where it will end. You cannot give assurance of uniform profit to a business so widespread and so competitive within and without its own ranks as is the bituminous coal industry."

Notwithstanding the fact that coal must be produced where found, be it forest or plain, desert of mountain, efficiency is not a stranger to the coal business. Neither is stabilization unknown. In the ten years preceding the World War average spot mine prices on bituminous coal held to a $1@$1.25 level. There were, it was true, violent fluctuations during the war and reconstruction periods, but at no time did the American consumer pay as much as Continental European coal users.

These causes of fluctuation have been removed. The danger of a transportation shortage has been eliminated. The great increase in non-union operations makes an effective nationwide strike impossible. The curve of prices and realizations, therefore, is again flattening out. There will be no violent change "unless there is another war or government interference."

The industry also is co-operating to improve coal combustion processes and consumption technique. Its so-called overdevelopment, which has been the salvation of the country during strikes, is less than that of certain other industries held up as models of efficiency. It leads the world in output per man. The percentage of machine-mined coal is three times that of Great Britain. The product is sold at prices which have given the nation the cheapest power supply in the world.

America, said Mr. Hoover, is gradually adjusting its industrial system to the instincts of industrial freedom and equality of opportunity. The country is developing a new relationship in industry which is departing widely from the conceptions of the old world. In wages, American industry has discarded the theory that the lowest rates of pay and the longest hours marked the roads to the lowest production costs and the highest profits. Labor, too, is abannoning the idea that restriction of individual output guarantees employment to the many.

"No one will doubt that labor always has accepted the dictum of the high wage, but labor has only gradually come to the view that unrestricted individual effort, driving of machinery to its utmost, and elimination of waste in production are the only secure foundations upon which a high real wage can be builded, because the greater the production the greater will be the quantity to divide."

Co-operation Brings Betterment

The greater development of the co-operative sense in industry also is contributing to business and social betterment. Associations have been created and expanded. The ethics of business have been elevated. Larger production units are coming into play although the public thinking on size is muddied by old conceptions of the effectiveness of ruthless competition. But mass production does not necessarily imply monopoly. "What we sorely need is thoughtful consideration directed to the essential question of how to maintain real competition, instead of legalistic formula; how to substitute constructive competition for destructive competition."

Mutualization and diffusion of stock ownership in many industries have made management ascendant over ownership in the control of business policies. The lessened pressure to enlarge profits has in many cases brought decreased prices, higher wages and more liberal expenditures for scientific research.

"Some of our industries have lagged behind others in the march toward stability, although they have kept up the march of efficiency. The bituminous coal industry, due to war expansion, destructive competition and other causes; the textile industry due to migration South and West, and especially some important branches of the agricultural industry are not yet in that stable condition which the nation requires."

British Muddled Through Again in Ending Tie-Up, Is Washington Opinion

By Paul Wooton
Washington Correspondent of *Coal Age*

Settlement of the general strike in the United Kingdom appeals to some in Washington as being typical of the ability of the British to muddle through. The nation's genius for negotiation and compromise again has carried them through a situation which was loaded with more evil possibilities than any other world development since the great war.

From the somewhat conflicting reports available at this writing it appears that the struggle has been a test of the general strike more than a determination of the mine-wage dispute which caused it. It was inevitable that the general strike should be tried. As long as it was untried some would be sure to urge it periodically and it would have continued to hang, sword-like, over the British people.

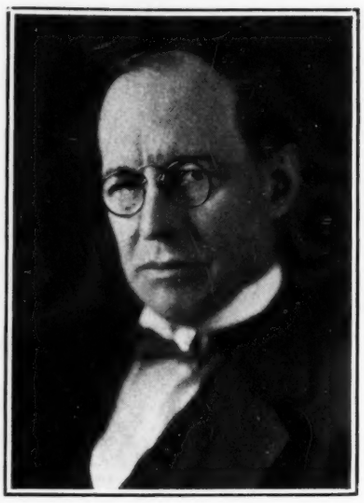
The test has shown that the general strike is a much less formidable weapon than the unions supposed. It did not bring the country to its knees. At the end of the nine days food prices had increased but little. The reaction of the people of the country in favor of the government and against the group threatening constituted authority with force developed as it had been predicted by the spokesman for the government.

On the other hand, the strike was more effective than the Tory extremists predicted. The enormous loss of production, the stoppage of foreign trade and the effective way in which obstacles were placed in the path of most industrial activity impressed the government sufficiently that it was willing to make material concessions.

Dispute Back Where It Started

The memorandum of settlement, to which the Conservative leaders must have agreed, tacitly at least, although the only name connected with it is that of Sir Herbert Samuel, chairman of the Royal Coal Commission, simply throws the coal dispute back where it started. After vowing that it never would consent to a subsidy after May 1, the government now obligates itself to continue the subsidy for "a reasonable time." Instead of standing pat for the wage recommendation of the Commission the question is to be referred to the national wage board on which operators and miners are to be represented with the "neutral element" under an impartial chairman. What is this but our old friend arbitration?

The trend toward socialism in Great Britain has been increased by this policy of compromise and evasion. There was a shortage of housing, so the government embarked in the house-renting business. In 1923 the ratio of unemployed to the total population was no greater in Great Britain than it was in this country, but instead of arousing the Kingdom to a great co-operative effort to provide employment, as was done here, Great Britain provided a dole and is still paying it. Such policies as these have extinguished the initiative of the people.



Daniel T. Pierce
Vice-Chairman, Anthracite Operators' Conference

France had a general strike once but the authorities rose to the occasion—called all classes to the colors—and the strike lasted twenty-four hours. Germany is working her way up from the bottom and labor is co-operating. Mussolini has saved the people of Italy from just such a situation as developed in Great Britain. If he restores democratic government he will go down in history as one of the world's greatest political leaders.

Among the British there has been no general effort to get the industrial establishment on a better basis. There has been no increased installation of labor-saving devices. The scientific and economical methods of generating and distributing electricity have lagged. We have extended power to the elbow of every workman. London still is served by twenty-eight central power stations. Instead of taking advantage of an exceptionally advantageous position for the installation of a great superpower system the British were busy with compromises—doing such uneconomic things as shortening the hours of labor so there would be more jobs or paying out subsidies of one kind or another. As a result the "workshop of the world" no longer is able to compete.

Hardens Class Feeling

It is hard to see how any good can come from the strike. The results all seem to be liabilities. One effect has been to freeze class feeling and to pave the way for more radicalism.

Thanks to the virility of our business, industrial and political leadership we have come through the hardest period in the economic history of the country with socialism and radicalism less in evidence than at any time in twenty-five years. Despite the gigantic losses of the war, we have raised the standard of living to a higher point than ever has been reached before. This has been done by correcting fundamentals and not by trying to compromise things of a social and economic character.

One thing, however, is certain. The British have shown no disposition to abandon the ballot box in favor of class force.

Score Hard-Coal Preparation At Retailers' Convention

Washington, D. C., May 17.—Sharp criticism of post-strike preparation of coal by anthracite mines broke as an unexpected climax to the first day's session of the ninth annual convention of the National Retail Coal Merchants' Association at the New Willard Hotel today. Daniel T. Pierce, vice-chairman, Anthracite Operators Conference, had just finished an eloquent plea for greater co-operation between the producers and retail distributors and an exhortation to the industry to clean its own house, when the criticism was voiced. Roderick Stephens, chairman of the governmental relations committee of the association, asked the delegates whether he was correct in asserting that sizing standards had not generally been maintained since the strike ended and that shipments with more than the permissible percentage of undersize had been common. A sea of upraised hands indorsed his statement.

Mr. Pierce's address was the feature of the afternoon session. He declared that the door was wide open for contact between the producers and the retailers. The anthracite industry, he said, intended to fight to the limit to retain its markets and to maintain its standards. Reputable producers did not want to ship poor coal and did not intend to allow poor coal to be shipped. They planned to use the peace won by the recent wage pact to expand and intensify their merchandising program.

The morning session was devoted to the presentation of reports from officers and committees. President Samuel B. Crowell presided.

Columbus Mining Co. Obtains Four More Mines

The Columbus Mining Co., eastern Kentucky operators with headquarters in Chicago, has taken over the sale and distribution of four additional mines in eastern Kentucky, it was learned last week. The company now has twelve mines in the field having an aggregate daily tonnage of between 6,000 and 8,000 in the Hazard and Elkhorn fields, producing from beds Nos. 4, 7 and 9.

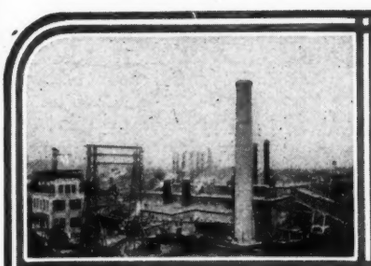
The new mines are the Meens Haskins Coal Corporation operations No. 1 and No. 2, at Vicco; the Diamond Block Coal Co. mine at Diablock and the Apex Elkhorn Coal Co. operation at Millstone.

While the company is merely the selling agent for the mines in the new transactions it is expected that the operations will be controlled by outright purchase within thirty days.

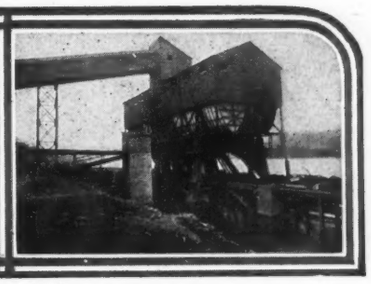
The Columbus Mining Co. began in the eastern Kentucky field in 1917 with one mine and has expanded to its present capacity of twelve in nine years.

Halt Rail Efficiency Probe

Investigation into the efficiency and economy of management of the country's common carriers has been discontinued by the Interstate Commerce Commission. No reason was given for the action. The inquiry was instituted after the shopmen's strike in 1922.



News Items From Field and Trade



ALABAMA

The eighth annual Alabama first-aid contest will be held in the City Auditorium, Birmingham, July 10. The various committees on arrangements are now planning the details, and indications point to the most successful event of the kind yet held. Intensive training is being carried on at mining centers throughout the district, the work being aided by officials of the local Bureau of Mines, of which C. E. Saxon is foreman miner and F. E. Cash, district mining engineer. The Alabama Mining Institute, through its secretary, James L. Davidson, and assistant secretary, H. E. Mills, is giving the event its undivided attention.

Receiver for Goodwin Co.—The Goodwin Coal Co., with a mining operation at Goodwin, near Dora, Walker County, has filed a petition in bankruptcy in the U. S. District Court at Birmingham. Liabilities were given as $144,341 and assets $173,641.39, the latter consisting of notes, machinery, etc. Milton H. Fies, of Birmingham, was appointed receiver. The company began business in 1925.

Galloway Plant Burns.—The Galloway Coal Co., with head offices in Memphis, Tenn., and a number of operations in the Carbon Hill section of Walker County, suffered a loss of $75,000 to $100,000 when fire destroyed its tipple and washery at Holley Grove mine on the night of May 7. It is understood that the plant will be rebuilt at once.

ILLINOIS

No. 7 mine of the Consolidated Coal Co. of St. Louis, one of the biggest at Herrin, has been shut down for an indefinite period. Slack market and necessary repairs were the reasons for the shut down. The mine employed about 500 men.

New Record by O'Gara.—The O'Gara Coal Co.'s mine No. 1, just south of Harrisburg, broke the company's record for daily production on May 1, when 3,202 tons of coal was mined, hoisted and placed in railroad cars in an eight-hour shift. This broke the record of 3,137 tons held by the company's No. 9 mine.

The Taylor-English mine, located nine miles southwest of Danville, which employs about 600 men when working at capacity, reopened early in May, after having been closed since June, 1, 1925.

The tipple and all top buildings at the Firbury mine were destroyed by fire May 9. It is improbable that they will be rebuilt as the expense of a steel tipple and other items required by law, coupled with the high costs of operating, will make it impossible for the mine to compete with non-union shafts.

INDIANA

Evidence to show that the abandonment of the Central Indiana R.R. between Muncie and Brazil is justified on account of operating losses, was submitted before Clyde H. Jones, member of the Public Service Commission, by representatives of the Big Four and the Pennsylvania railroads, joint owners of the line. Opposition to the abandonment of the road was voiced before the Commissioner by business men, farmers and others living in the territory through which the road operates.

The Vandalia Coal Corporation, a Delaware corporation, has qualified to engage in coal mining in Indiana. The company has 14,128 shares, of no par value. Agent for service of process, Robert W. McBride, 1239 State Life Building, Indianapolis.

KANSAS

The Stephenson-Fenimore Coal Co., of Pittsburg, Kan., was granted a charter May 7 by the Kansas state charter board. The company, of which J. J. Stephenson and James Fenimore are principals, is capitalized at $100,000. It has purchased and will operate a strip pit, known as Reliance No. 1, near Midway. The purchase was made from the Reliance Coal Co. and included the steam shovel at the mine and fee to 100 acres of coal land. A mining lease on 400 adjacent acres, of which about 100 acres is underlaid with coal, also was obtained. Mr. Stephenson and his son opened the mine in 1914 and operated it until 1917, when they sold it to the Reliance company, which operated it until the sale, late in April to the new company. The 400 acres of leased land also belonged to the Stephensons until 1917. They sold it then to Hugh Beasley, from whom the Stephenson-Fenimore company leased it.

MINNESOTA

Ford to Acquire Superior Dock.—Indications are that the Ford interests will close the purchase of the old Superior Coal & Dock Co. dock at Duluth. A decision has been reached in the matter of taxes, which had been in litigation, and it seems likely that the purchase will be made.

The Brown Coal Co. has moved its offices from the Security Building, Minneapolis, to the new Baker Building.

MISSOURI

Coal Development is being undertaken in the northeastern part of Barton County, which, if successful will extend the Pittsburg field. The Duvall Loan Co. and the Sherwood Coal Co. have opened offices in Milford. Both concerns own large acreage and are optioning additional land for purchase at $40 to $70 an acre. The Duvall company has much drilling and J. B. Duvall, the field manager, has indicated that the results warrant the installation of steam shovels.

U. P. to Build—The Union Pacific Coal Co. will spend $359,904 for new buildings and new machinery during the next year, according to the budget recently adopted by the board of directors. One of the chief improvements will be the erection of a new building in Rock Springs to house all general offices of the company, which are at present in three buildings; the company store, and the Southern Wyoming Electric Co.'s sales division.

The Kolb Coal Co. announces the removal of its offices to suite 718 to 721 Louderman Building, Eleventh & Locust Sts., St. Louis.

The contract to supply coal to the public schools of St. Louis was awarded to the Hawthorne Coal Co., of St. Louis for $3.65 for Standard lump delivered in the bins. The contract is for about 32,000 tons.

MONTANA

The Interior Department will lease at public auction 40 acres of public coal land in Big Horn County, through the land office at Billings, requiring an initial investment of $500 during the first three years, with a minimum production of 275 tons annually commencing the fourth year, the government to receive a royalty of 15c. per ton, mine-run, on coal produced.

OHIO

The Stalter-Essex Coal Co., announces the reopening of Mine No. 7, near Pomeroy, in the Pomeroy Bend field, which had been closed for about a month, due to the embargo on lake shipments. This mine employs 100 men and together with Mine No. 5, in the same field, produces 1,800 tons daily. Both mines are operated under the 1917 wage scale. The product has been contracted for in the lake trade, according to Fred Essex, head of the company. The Ohio Mining Co., another subsidiary, is operating mines Nos. 87 and 144, at Jacksonville, Ohio. These mines are being operated under the Jacksonville scale.

Coal Financing Closes Bank.—Protecting T. S. Jones' coal interests in West Virginia, closed up the Union Savings Bank of Yorkville, but everything is expected to turn out all right, so that the bank can open again. The state bank examiners closed the institution as a result, it was said, of a loan of $305,000 to Jones, who is vice-president of the bank. C. W. Heil, president of the bank, said the loan was given to protect Jones' investments in West Virginia. But the bank examiners said no banking institution may lend more than 10 per cent of its capital, and as the institution is capitalized at $100,000, the law was violated. The resources of the bank are said to be more than $1,000,000. No charges were filed against anyone.

Columbus Opens School Bids.—Bids opened May 13 by the Columbus Board of Education for 15,000 tons of lump or mine-run coal and 2,000 tons of nut, pea and slack for the public schools were as follows: West Virginia and Kentucky lump—Bell Coal Co., Columbus, $4.48; Colonial Fuel Co., Columbus, $4.32; Reliable Coal & Supply Co., Columbus, $4.79. West Virginia nut, pea and slack—Bell Coal Co., $4.29; Burns Coal Co., Columbus, $3.69; Colonial Fuel Co., $3.58; Franklin Builders' Supply & Coal Co., Columbus, $4.29; William Miller, Columbus, $3.93. Ohio lump—Bell Coal Co., $3.94; Burns Coal Co., $4.30; Franklin Builders' Supply & Coal Co., $4.55; Hub Builders' Supply & Coal Co., Columbus, $4; William Miller, $3.94. Ohio mine-run—Bell Coal Co., $3.86; Franklin Builders' Supply & Coal Co., $4.36; William Miller, $3.74; Third Avenue Coal Co., Columbus, $4.34. Ohio nut, pea and slack—Franklin Builders' Supply & Coal Co., $3.66; William Miller, $3.30.

PENNSYLVANIA

The Snowdon Coke Co., near Brownsville, is firing 75 additional ovens that were put out with the settlement of the anthracite strike. All of the company's 295 ovens now are in blast. Five ovens are permanently out of commission due to the erection of a coal bin over these ovens in connection with a coal tipple that is being built.

First-quarter earnings of Pittsburgh Terminal Coal Corporation were $114,665 after all charges but before federal taxes, compared with net deficit of $91,813 in the first quarter of 1925. The company closed down five of its mines last month, leaving only two in operation.

Sweeney Brothers, of Scranton, have just put through an agreement with the Delaware & Hudson Co. whereby they obtain a five-year lease on a culm dump near White's Crossing on the Honesdale branch of the railroad. The contractors are to pay the railroad royalty of 50c. a ton and put up a bond of $10,000 as a guarantee that they will market 20,000 tons before the lease expires.

The Jones & Laughlin Steel Co. is engaged in placing gantry cranes on Neville Island for the purpose of unloading coal from barges to its cold-storage plant. A number of these cranes are being brought on barges up the river from Memphis.

Glen Alden Defers Dividend.—Directors of the Glen Alden Coal Co., at Scranton, failed to take action May 11 on the semi-annual dividend which is due at this time. The expectation was that the dividend rate would be increased or that an extra disbursement would be declared. Final action on this matter, however, was postponed until the June meeting.

The Hillman Coal & Coke Co. has given an order to the American Bridge Co. for the construction of 20 all-steel barges for the coal towing trade. Each of these barges will be 175 ft. long, 26 ft. wide and 11 ft. deep. There will be 3,200 tons of steel in their construction.

The mine of the Clearfield Bituminous Coal Corp. located at Rossiter has resumed work after having been idle for a few weeks. The tipple at the mine was recently destroyed by fire. Loss, including machinery, was $60,000. About 750 men are employed.

Passes 50,000 Tons Daily. — Open-shop mines of the Pittsburgh Coal Co. attained an output of 50,162 tons from 11 mines for the first time during the week ended May 8, it is just announced by the company. This total does not include Delmont mine, in Westmoreland County, which has always been a non-union mine, but only the former union pits in western Pennsylvania. The company has 2,500 men at work.

Reading Conversion Time Extended.—Further extension of time for converting old stock to the new issue in connection with the segregation of the Reading Company's interest in coal and railroad properties, as decreed by the federal courts, was granted in Philadelphia early last week. Certificate holders now have until July 1, 1927, to exchange their rights for new shares, the U. S. Circuit Court of Appeals having previously extended the time until Jan. 1, 1927. Counsel for the company urged that the hard-coal strike had interfered with the exercise of the rights of conversion. Joseph Wayne, Jr., Philadelphia, was appointed a trustee of the new coal company's stock, succeeding the late Joseph B. McCall, Philadelphia. The other trustee is N. H. Fairbanks, Springfield, Ill.

WEST VIRGINIA

The West Run Coal & Coke Co., Scottdale, Pa., a West Virginia corporation, has surrendered its charter, according to a certificate filed in the office of the Secretary of State in Charleston.

The Vulcan store of the Elkhorn Piney Coal Mining Co., at Powellton, was completely destroyed by fire on April 15, together with the entire stock of goods. When discovered the blaze had gained such headway that it was impossible to save the building.

The meeting of the West Virginia Coal Mining Institute, which was scheduled to have been held in Bluefield on June 1 and 2, has been postponed until July 13 and 14, according to an announcement made by Robert M. Lambie, chief of the state Department of Mines, who is president of the institute. Because of the many meetings arranged to attract coal operators and tradesmen the meeting of the state organization was deferred.

A modern rotary dump and a new system of mine cars have been added to the facilities of Brooklyn Mine of the Scotia Coal & Coke Co. near Finlow, Fayette County.

Officials of the United States Coal and Coke Co. at Gary were officially congratulated last week in a telegram from Herbert Hoover, Secretary of Commerce. The message was prompted by the winning of the national safety trophy by the Gary No. 6 mine and of honorable mention in the national safety contest by Gary No. 3 mine.

Plans are being made to celebrate Safety Day in West Virginia by holding a first-aid and mine rescue-contest at Huntington on Aug. 31, when a large gathering of mining men from all parts of the state will be in attendance. Prominent mining men from West Virginia and other states will address the banquet in the evening. Prior to the observance of Safety Day there will be a series of safety meetings in all parts of the state.

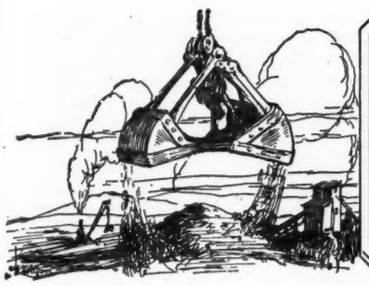
A new tipple is being erected at mine No. 4 of the Winding Gulf Collieries Co., at Winding Gulf, Raleigh County. Uprights have been erected and the work will be completed by July 1.

Coal mines along the Norfolk & Western Railway in April loaded 3,162,230 tons of coal compared to 3,353,480 tons in March. Production in the various fields last month were as follows: Pocahontas, 30,175 cars; Tug River, 11,475 cars; Thacker, 3,298 cars; Kenova, 3,593 cars.

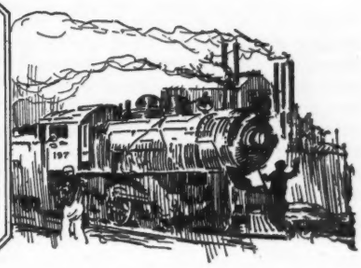
Mining extension students, who took the course offered jointly by the federal government under the Smith-Hughes act and West Virginia University, Morgantown, are planning a banquet to be held in Welch on Friday evening, May 21. Robert M. Lambie, chief of the state Department of Mines, has been asked to act as toastmaster.

CANADA

Coal Probe to Begin.—Organization of the special committee named by the House at Ottawa last week to investigate the domestic coal question in Canada will begin this week. Edmond A. Lapierre (Nipissing) is likely to be chosen chairman. As a result of the debate in the House it is probable that the scope of the committee will be widened to probe the cost of production and distribution of domestic coal, mined in Alberta and the Maritime Provinces, and the committee is likely to avail itself of the data now in the hands of the Dominion Railway Board on this matter following its inquiry on the instructions of an Order-in-Council a few weeks more. Another question which may be discussed is that brought up by James Malcolm (North Bruce), who urged the government to consider the question of control of production, especially in the Alberta region. He thought some form of control would help to distribute production more evenly, afford more stable employment to the miners and thereby help to reduce the cost of producing the coal. It was only by such a cut in the cost of production, he said, that coal delivered in Ontario could be enabled to compete successfully with United States coal.



Production And the Market



Market Outlook Brighter as Lake Movement Picks Up; British Strike Discounted

The British strike did not last long enough to have much effect on the bituminous-coal markets of the United States; as a matter of fact, for even its limited duration its influence was far from important, being of an indirect character. While there was an appreciable expansion of inquiries from sources normally dependent upon British coal, accompanied by a pronounced hardening in quotations for West Virginia smokeless coals, there was no impressive spot buying. Though the British miners have not yet returned to work and each day that they stay out will have a bearing on the usual British markets, potential production on this side is such that the effect will be quickly discounted.

Smokeless coal has reappeared in the Midwest market, with lump and egg priced at about $3 and nut at $2. Southern Illinois producers continue to hold to their circular, aided by a spell of unusually cold weather for May, which has kept domestic demand active. The placing of a number of large railroad contracts has helped the steam-coal situation considerably.

Embargoes on Lake Coal Lifted

Lifting of embargoes on lake coal movement to Toledo and Sandusky has brightened the outlook in central and southern Ohio. Although Ohio coal will play a small part in the lake business, the volume of distress coal has been lightened and competition for all-rail business lessened. In Kentucky too the outlook is brighter; railroad and industrial buying are substantial and domestic demand is somewhat better. Full headway on lake movement will be a further stimulus.

Unloading of cargoes at the Head of the Lakes has been heavy. Movement from the docks, however, has been only moderate, but as the industrial outlook is good there is no apprehension. During the week ended May 16 dumpings at the lower ports included 1,144,712 tons of cargo bituminous and 47,748 tons of vessel fuel. The total for the season to that date was 2,790,618 tons, as compared with 3,427,720 tons a year ago and 2,337,287 tons in 1924.

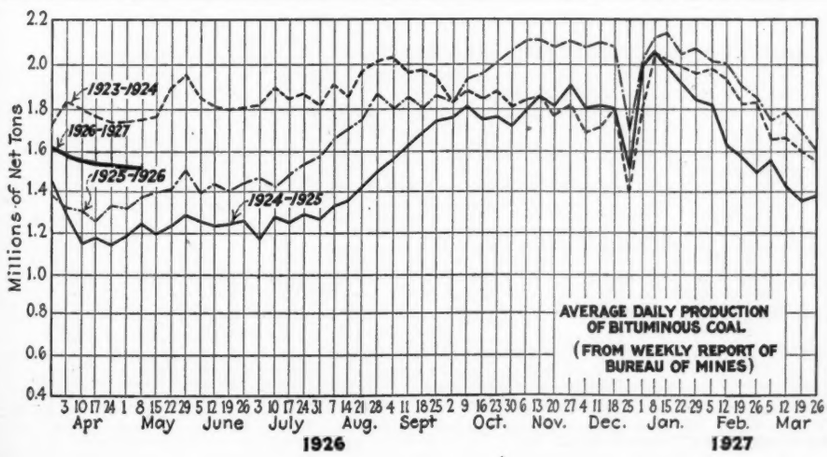
The policy of operators in scaling down output to the level of demand continues to show results. Production during the week ended May 8 was estimated by the Bureau of Mines at 9,031,000 net tons, a decrease of 94,000 tons from the revised figure for the preceding week. Nevertheless Kentucky and West Virginia coals are bringing conspicuously low prices in Midwest markets. While "no bills" are slightly less in evidence on the whole, Ohio markets suffer keenly from this evil.

Spot Prices Suffer Reaction

Coal Age Index of spot bituminous prices dropped back after last week's advance. As of May 17 the index figure stood at 159 and the corresponding price was $1.93, as against 161 and $1.95 the week before.

Heavy production of anthracite has taken the snap out of the hard-coal market. Company producers are moving domestic sizes with comparative ease, but the independents are finding their work cut out for them to induce purchasers to pay fancy premiums for their product. Consumers are in no hurry to lay in supplies for next winter, though it is expected that the present retail stocks, which are fair, will be pared down by pre-vacation fill-ups. The steam sizes are inactive.

The spot market for Connellsville coke is sluggish. Production continues to be reduced, but nevertheless there is a mad rush for what little spot business there is and prices are sliding.



Estimates of Production

(Net Tons)

	1925	1926
BITUMINOUS		
April 24	8,030,000	9,271,000
May 1 (*a*)	7,987,000	9,125,000
May 8 (*b*)	8,277,000	9,031,000
Daily average	1,380,000	1,505,000
Cal. yr. to date....(*c*)	170,653,000	196,472,000
Dail av. to date....	1,569,000	1,805,000
ANTHRACITE		
April 24	1,890,000	2,087,000
May 1	1,936,000	2,098,000
May 8	1,987,000	1,985,000
Cal. yr. to date....(*c*)	30,908,000	21,559,000
BEEHIVE COKE		
May 1 (*a*)	169,000	210,000
May 8 (*b*)	143,000	212,000
Cal. yr. to date....(*c*)	4,250,000	5,170,000

(*a*) Revised since last report. (*b*) Subject to revision. (*c*) Adjusted to equalize number of days in the two years.

Cool Wave Helps Middle West

Unusually cold weather last week kept the Midwest domestic market alive, an unexpectedly favorable tonnage of prepared coal moving forward. Very low prices prevailed on eastern Kentucky and West Virginia fuels. Some operators have quoted as low as $1.85 per ton, f.o.b. mines, for shaker screened 4-in. block, and West Virginia 4x2-in. egg in some instances has gone as low as $1.40 per ton.

Producers of smokeless coal are now back on the market, and their quotations are on the basis of approximately $3 for lump and egg, and $2 for nut. Southern Illinois operators are continuing to hold their circular at the $2.60 level for 6-in. lump, and report a fair volume of business.

There has been some activity in the steam market during the past few days. Prices have strengthened on all grades of screenings, from No. 5 duff to full 2-in., and a number of large railroad contracts have recently been placed.

Business continues quiet in Williamson, Franklin and Saline counties. Lump and egg are piling up at the mines that are working and nut is not moving as fast as it is being produced. Nearly all the shaft mines that have crushers are using them. A few additional mines have been reported as suspending operations for the summer. Stripping operations seem to be showing up fairly well and working steadily, although the prices they are receiving are somewhat uncertain.

A late cool spring at St. Louis has caused demand for domestic tonnage in small quantities, principally of the cheaper grades.

Kentucky Outlook Brightens

The outlook in the Kentucky field is brightening. Although lake coal has not yet started to move in volume from the eastern part of the state, there is a fair tonnage going to all-rail destinations in the southeast and north of the Ohio River. Western Kentucky mines also are enjoying a good run of business to northern markets. Domestic demand has improved slightly, and industrial buying absorbs all the screenings offered. Railroad purchases, too, are on a substantial basis. Spot quotations on screenings are stronger and there has been no weakening in prices on other sizes in either field.

Dock companies at the Head of the Lakes have been kept busy unloading the heavy run of cargoes. Between May 5 and 10 67 boats were discharged and 15 additional cargoes were en route. Coal men at Superior and Duluth expect to handle about 900,000 tons of anthracite and to make further recoveries of bituminous business that has been going to Illinois and Indiana mines.

Shipments from the docks during the past fortnight have been on a modest basis, but this causes no uneasiness. The industrial outlook is healthy and prices are well maintained. During April shipments aggregated 11,855 cars, as compared with 14,836 cars in March and 9,210 cars in April, 1925. Present

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	May 18 1925	May 3 1926	May 10 1926	May 17 1926†
Smokeless lump	Columbus	$2.85	$2.60	$2.85	**$3.00@$3.25**
Smokeless mine run	Columbus	1.85	1.90	2.00	**2.00@ 2.15**
Smokeless screenings	Columbus	1.45	1.20	1.25	1.15@ 1.35
Smokeless lump	Chicago	2.85	2.60	3.10	3.00@ 3.25
Smokeless mine run	Chicago	1.85	1.80	2.00	2.00
Smokeless lump	Cincinnati	2.85	2.85	3.00	**3.00@ 3.25**
Smokeless mine run	Cincinnati	2.00	1.80	1.80	1.75@ 1.90
Smokeless screenings	Cincinnati	1.35	1.35	1.35	*1.25@ 1.35*
*Smokeless mine run	Boston	4.25	4.30	4.60	**4.75@ 5.00**
Clearfield mine run	Boston	1.85	1.80	1.90	*1.70@ 2.00*
Cambria mine run	Boston	2.10	2.10	2.10	2.00@ 2.25
Somerset mine run	Boston	1.95	1.90	2.00	*1.85@ 2.10*
Pool 1 (Navy Standard)	New York	2.55	2.60	2.60	2.50@ 2.75
Pool 1 (Navy Standard)	Philadelphia	2.60	2.80	2.80	2.65@ 3.00
Pool 1 (Navy Standard)	Baltimore	1.95	1.95	1.95	1.90@ 2.00
Pool 9 (Super. Low Vol.)	New York	2.00	2.05	2.10	2.00@ 2.25
Pool 9 (Super. Low Vol.)	Philadelphia	2.00	2.35	2.35	2.20@ 2.50
Pool 9 (Super. Low Vol.)	Baltimore	1.85	1.75	1.75	1.70@ 1.80
Pool 10 (H.Gr.Low Vol.)	New York	1.85	1.85	1.85	1.70@ 2.00
Pool 10 (H.Gr.Low Vol.)	Philadelphia	1.70	2.05	2.05	1.90@ 2.25
Pool 10 (H.Gr.Low Vol.)	Baltimore	1.70	1.60	1.60	1.55@ 1.65
Pool 11 (Low Vol.)	New York	1.50	1.60	1.60	1.50@ 1.75
Pool 11 (Low Vol.)	Philadelphia	1.55	1.70	1.70	1.55@ 1.85
Pool 11 (Low Vol.)	Baltimore	1.45	1.45	1.45	1.45@ 1.50
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.50	1.40	1.40	1.30@ 1.55
Pool 54-64 (Gas and St.)	Philadelphia	1.50	1.45	1.45	1.35@ 1.55
Pool 54-64 (Gas and St.)	Baltimore	1.50	1.25	1.25	1.25@ 1.30
Pittsburgh se'd gas	Pittsburgh	2.40	2.30	2.30	2.25@ 2.40
Pittsburgh gas mine run	Pittsburgh	2.15	2.05	2.05	2.00@ 2.15
Pittsburgh mine run (St.)	Pittsburgh	1.95	1.80	1.80	1.75@ 1.90
Pittsburgh slack (Gas)	Pittsburgh	1.55	1.55	1.55	*1.45@ 1.55*
Kanawha lump	Columbus	2.10	2.05	2.05	1.85@ 2.25
Kanawha mine run	Columbus	1.40	1.55	1.55	1.40@ 1.75
Kanawha screenings	Columbus	1.10	1.00	1.00	*.85@ 1.05*
W. Va. lump	Cincinnati	2.05	1.85	1.85	1.75@ 2.00
W. Va. gas mine run	Cincinnati	1.40	1.50	1.55	*1.40@ 1.60*
W. Va. steam mine run	Cincinnati	1.30	1.40	1.40	*1.25@ 1.35*
W. Va. screenings	Cincinnati	1.10	1.00	1.00	**1.00@ 1.10**
Hocking lump	Columbus	2.25	2.35	2.35	2.25@ 2.50
Hocking mine run	Columbus	1.40	1.55	1.55	1.40@ 1.75
Hocking screenings	Columbus	1.10	1.05	1.05	1.00@ 1.15
Pitts. No. 8 lump	Cleveland	2.25	2.20	2.15	*1.75@ 2.50*
Pitts. No. 8 mine run	Cleveland	1.90	1.80	1.80	*1.65@ 1.70*
Pitts. No. 8 screenings	Cleveland	1.40	1.40	1.35	*1.25@ 1.35*

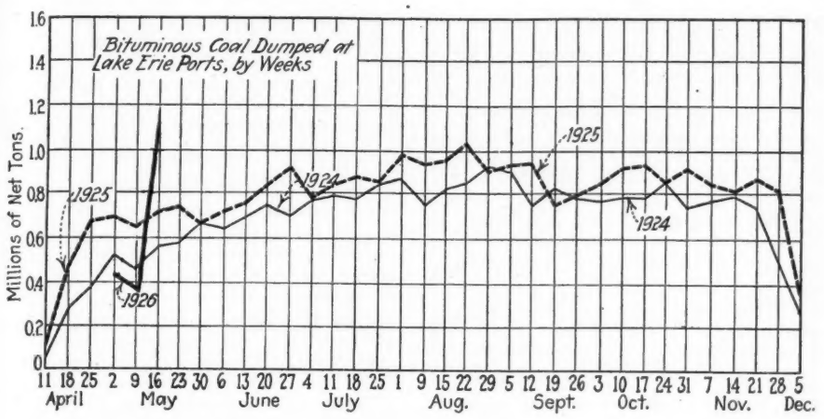
Midwest	Market Quoted	May 18 1925	May 3 1926	May 10 1926	May 17 1926†
Franklin, Ill. lump	Chicago	$2.60	$2.60	$2.60	$2.60
Franklin, Ill. mine run	Chicago	2.35	2.40	2.40	2.35@ 2.50
Franklin, Ill. screenings	Chicago	2.10	1.90	1.90	1.85@ 2.00
Central, Ill. lump	Chicago	2.35	2.30	2.30	2.25@ 2.40
Central, Ill. mine run	Chicago	2.10	2.05	2.05	2.00@ 2.15
Central, Ill. screenings	Chicago	1.85	1.55	1.55	**1.60@ 1.80**
Ind. 4th Vein lump	Chicago	2.60	2.40	2.40	2.25@ 2.60
Ind. 4th Vein mine run	Chicago	2.35	2.15	2.15	2.10@ 2.25
Ind. 4th Vein screenings	Chicago	2.00	1.80	1.80	1.75@ 1.90
Ind. 5th Vein lump	Chicago	2.25	2.15	2.15	2.00@ 2.35
Ind. 5th Vein mine run	Chicago	1.95	1.95	1.95	1.85@ 2.10
Ind. 5th Vein screenings	Chicago	1.60	1.35	1.35	1.30@ 1.45
Mt. Olive lump	St. Louis	2.50	2.50	2.50	*2.25@ 2.50*
Mt. Olive mine run	St. Louis	2.25	2.15	2.15	2.15
Mt. Olive screenings	St. Louis	1.75	1.40	1.40	**1.50@ 1.60**
Standard lump	St. Louis	2.25	2.50	2.50	*2.25*
Standard mine run	St. Louis	1.80	1.80	1.80	1.75@ 1.85
Standard screenings	St. Louis	1.70	1.15	1.15	**1.25@ 1.40**
West Ky. block	Louisville	1.65	1.75	1.75	1.65@ 1.85
West Ky. mine run	Louisville	1.35	1.25	1.25	1.10@ 1.40
West Ky. screenings	Louisville	1.20	1.05	1.10	**1.00@ 1.25**
West Ky. block	Chicago	2.00	1.75	1.75	1.65@ 1.85
West Ky. mine run	Chicago	1.30	1.15	1.15	.80@ 1.50
South and Southwest					
Big Seam lump	Birmingham	2.30	2.15	2.15	1.90@ 2.40
Big Seam mine run	Birmingham	1.75	2.00	2.00	1.75@ 2.25
Big Seam (washed)	Birmingham	1.85	2.00	2.00	1.75@ 2.25
S. E. Ky. block	Chicago	2.25	2.40	2.40	2.10@ 2.75
S. E. Ky. mine run	Chicago	1.70	1.65	1.65	1.50@ 1.85
S. E. Ky. block	Louisville	2.20	2.05	2.05	1.85@ 2.25
S. E. Ky. mine run	Louisville	1.30	1.50	1.50	1.35@ 1.65
S. E. Ky. screenings	Louisville	1.10	1.05	1.05	**1.00@ 1.15**
S. E. Ky. block	Cincinnati	2.20	2.50	2.50	*2.00@ 2.75*
S. E. Ky. mine run	Cincinnati	1.35	1.50	1.55	*1.25@ 1.75*
S. E. Ky. screenings	Cincinnati	1.10	1.00	.90	**.90@ 1.10**
Kansas lump	Kansas City	4.10	4.00	4.00	4.00
Kansas mine run	Kansas City	2.85	3.00	3.00	3.00
Kansas screenings	Kansas City	2.60	2.50	2.50	2.50

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**; declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	May 18, 1925 Independent	May 18, 1925 Company	May 10, 1926 Independent	May 10, 1926 Company	May 17, 1926† Independent	May 17, 1926† Company
Broken	New York	$2.34	.....	$8.05@$8.60	.....	$8.25@$9.25	.....	$8.25@$9.25
Broken	Philadelphia	2.39	.....	8.60	$9.25	9.00@ 9.25	$9.25	9.00@ 9.25
Egg	New York	2.34	$8.65@$8.95	8.35@ 8.60	9.00@ 9.50	8.75@ 9.25	*8.75@ 9.00*	8.75@ 9.25
Egg	Philadelphia	2.39	8.60@ 9.30	8.40@ 8.60	9.25@ 9.75	9.15@ 9.25	9.25@ 9.75	9.15@ 9.25
Egg	Chicago*	5.06	7.86@ 8.50	7.44@ 8.18	8.48	8.13	8.48	8.13
Stove	New York	2.34	8.85@ 9.25	8.85@ 9.10	9.25@ 9.75	9.25@ 9.50	9.25@ 9.75	9.25@ 9.50
Stove	Philadelphia	2.39	9.20@ 9.75	8.85@ 9.00	9.60@10.00	9.35@ 9.50	9.60@10.00	9.35@ 9.50
Stove	Chicago*	5.06	8.22@ 8.70	7.92@ 8.10	8.84	8.33@ 8.58	8.84	8.33@ 8.58
Chestnut	New York	2.34	8.50@ 8.75	8.35@ 8.60	9.25@ 9.50	8.75@ 9.15	*8.75@ 9.25*	8.75@ 9.15
Chestnut	Philadelphia	2.39	8.60@ 9.45	8.50@ 8.60	9.25@ 9.50	9.00@ 9.15	9.25@ 9.50	9.00@ 9.15
Chestnut	Chicago*	5.06	8.14@ 8.35	7.69@ 8.00	8.71	8.38@ 8.58	8.71	8.38@ 8.50
Pea	New York	2.22	5.00@ 5.50	5.00@ 5.60	6.50@ 7.25	6.00@ 6.25	*6.25@ 7.25*	6.00@ 6.25
Pea	Philadelphia	2.14	5.40@ 5.75	5.00@ 5.40	6.50@ 7.00	6.00@ 6.50	6.50@ 7.00	6.00@ 6.50
Pea	Chicago*	4.79	4.91@ 5.36	4.69@ 5.00	6.03	5.65@ 5.80	6.03	5.65@ 5.80
Buckwheat No. 1	New York	2.22	2.00@ 2.60	2.50	1.85@ 2.50	3.00@ 3.50	*1.70@ 2.50*	3.00@ 3.50
Buckwheat No. 1	Philadelphia	2.14	2.25@ 2.75	2.50	2.00@ 2.50	2.50@ 2.75	2.00@ 2.50	2.50@ 2.75
Rice	New York	2.22	1.75@ 2.10	2.00	1.50@ 2.00	2.00@ 2.25	*1.50@ 2.00*	2.00@ 2.25
Rice	Philadelphia	2.14	1.90@ 2.00	2.00	1.75@ 2.25	2.00@ 2.25	1.75@ 2.25	2.00@ 2.25
Barley	New York	2.22	1.40@ 1.60	1.50	1.00@ 1.50	1.50@ 1.75	1.25@ 1.50	1.50@ 1.75
Barley	Philadelphia	2.14	1.50	1.50	1.50@ 1.60	1.75	1.50@ 1.60	1.75
Birdseye	New York	2.22	1.40@ 1.60	1.60	.....	2.00	1.30@ 1.60	2.00

*Net tons, f.o.b. mines. †Advances over previous week shown in **heavy type**; declines in *italics*.



estimates place the May total at approximately 11,000 cars. Contracts with large consumers are being renewed with little difficulty.

Inflow of coal by cargo to Milwaukee continues steady, but is slower than during the opening weeks of last year because of ice conditions in Lake Erie. Up to May 13 only 20,000 tons of anthracite had been received in Milwaukee, against 168,908 tons at the same date in 1925. Bituminous coal received up to May 13 totaled 203,809 tons as against 339,660 up to the same date last May. The market continues satisfactory.

Wisconsin to Probe Prices

Milwaukee dealers are disturbed by the announcement of a state investigation of prices of fuel in Milwaukee and interior points. The state Market Commissioner says a report by an official committee "shows a difference of $5.20 a ton in the retail price of prepared Pocahontas coal in Wisconsin cities during the winter months of 1925-26."

Usual early season quiet in the Twin Cities has been intensified by slack commercial conditions and erratic weather. Little progress has been made in lining up future business. Several railroads have been considering contracts, but little aside from these has been available. The local market has held fairly firm, with little offering at concessions. Prices are fairly well maintained on the basis prevailing for some time. Southern Illinois lump is $2.60; central Illinois, $2.25; western Kentucky, $1.75.

Current Business Slow in Kansas

In the Southwest operators are receiving few orders for immediate delivery, though a fair list for future delivery is accumulating. While some summer storage is reported, it is not sufficient to have any noticeable effect on the market. Kansas lump and nut are accumulating at the mines but in smaller quantities than in former years when crushers were not so generally used throughout the Southwest. Crushing of strip-pit production to fill steam orders is preventing any shortage in that market.

There has been a slight recession in domestic demand for Colorado coal, particularly in Nebraska, Kansas and Oklahoma. The Denver local market, on the other hand, is active. Industrial buying also holds up. The price situation with respect to both Colorado and Wyoming coals is unchanged. Except for belated cold weather in the Salt Lake City retail market, the general situation in the Utah field shows no material variation from that prevailing in recent weeks.

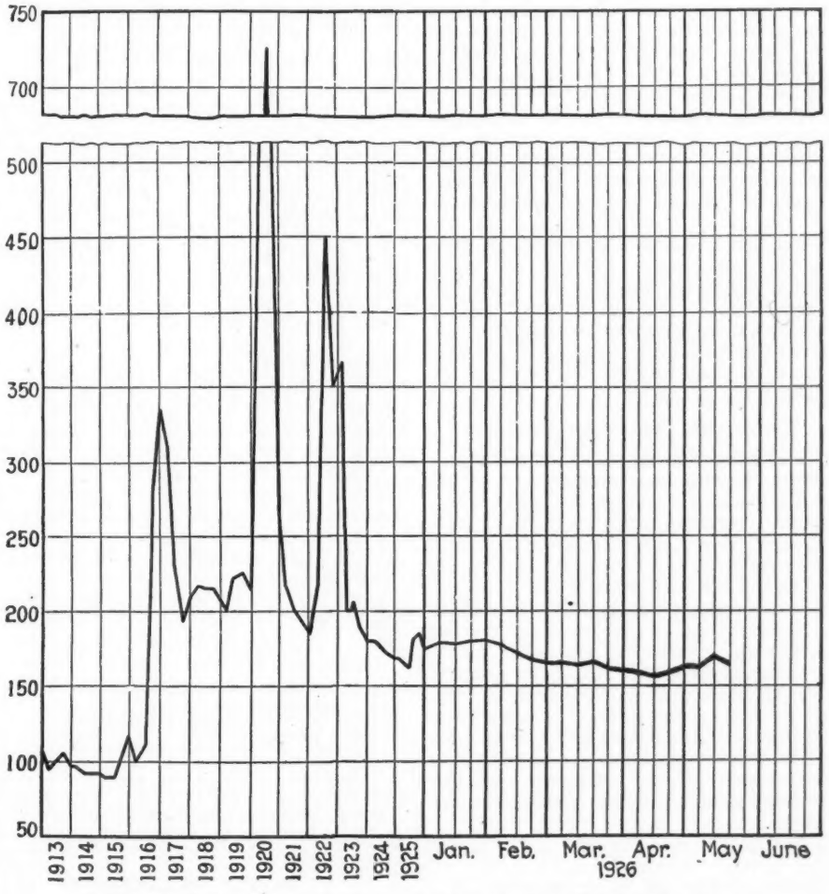
Smokeless Stiffens at Cincinnati

Lake business, now getting its start six weeks late and with a huge tonnage to pass over the unloaders, has given snap to the Cincinnati market. Smokeless has bettered more than other lines. All standard stuff is firmly held at $3 for lump and egg, with some specialty offerings as high as $3.25 spot. Direct sales offices say they are sold up on their make of prepared. Nut goes all the way from $1.75 to $2.50, depending on selling conditions at the mines. Low-volatile mine-run is a bit better. Not so much $1.75 coal is to be had and even on large orders $1.90 is reasonably obtainable. The better part of the screenings shipments go at $1.25, though some large sales have been made at $1.35 where the grading was exceptional or suited for a specific purpose.

In high volatile slack has stiffened once more, so that $1 is low, good by-products and gases bringing around $1.10 and $1.15. Mine-run is $1.25@$1.35 for steam, though byproduct is still firmly held. Egg still ranges at $1.50@$1.75. Two-inch for the lakes sells all the way from $1.65 to $1.90 with the inquiry bettering.

Retail business has tapered off due to warmer weather. River business continues in volume, but little or no storage stuff is going to the stockpiles.

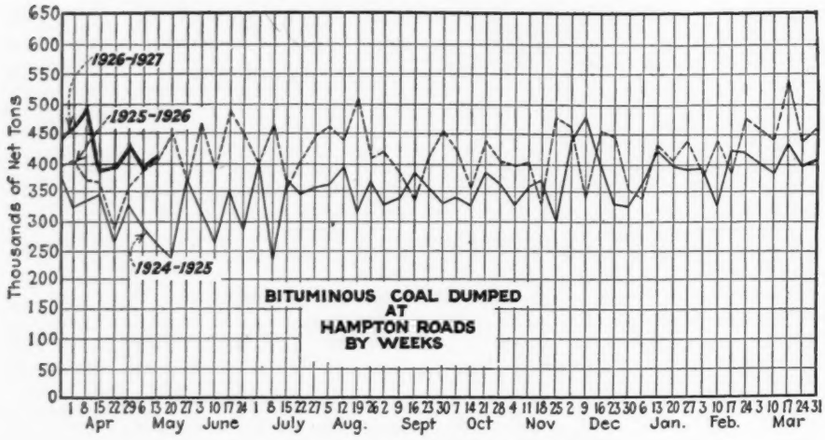
Lifting of the embargoes on lake coal to Toledo and Sandusky has dissipated the gloom which has been enshrouding central and southern Ohio trade for the past few months. Although Ohio operators expect only a



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	1926				1925	1924
	May 17	May 10	May 3	April 26	May 18	May 19
Weighted average price	$1.93	$1.95	$1.92	$1.93	$1.95	$2.05
Index	159	161	159	159	161	169

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke: 1913-1918," published by the Geological Survey and the War Industries Board.



meager share of the lake tonnage, the opening of the season takes off the pressure of distress coal, and somewhat lessens non-union competition for all-rail business. Large consumers are showing more interest and a few contracts have been closed. Contract prices, however, are low.

Domestic demand is at a standstill. This situation helps to maintain a strong market for screenings and prices on that grade are firmer. Production is still at a low ebb. Most of the larger mines in southern Ohio are down and the output from those running does not exceed 15 to 18 per cent of the potential capacity of the field.

Buying in eastern Ohio is very slow, practically all prices are now at or below the cost of production, and lethargy is pronounced. There is considerable "no bill" coal on track at the mines. Aside from vessel fuel, the No. 8 district is doing comparatively little in the lake trade. During the week ended May 8, this district produced 210,000 tons or about 30 per cent of potential capacity. This is an increase of 21,000 tons over the preceding week, but 7,000 tons under the corresponding week a year ago.

Pittsburgh Depression Increases

The only change noted in the Pittsburgh district last week was a slight softening in the market for spot screenings. Demand continues light. Most of the union production of western Pennsylvania is now coming from mines on the Pan Handle and they are not averaging over two or three days a week. Some of the Bessemer district open-shop operations are doing better in running time, but there is no profit in the tonnage. The Pittsburgh district as a whole is not averaging over 20 to 25 per cent of capacity and a large part of this comes from captive mines. Over 50 per cent of the commercial production is being mined by open-shop operations.

The new month brought a slight gain in central Pennsylvania production. Loadings for the first week in May were 14,233 cars, or approximately 2,000 cars more than in the first week of April. Approximately 80 per cent of the tonnage is non-union. Pool 1 coal is quoted at $2.45@$2.60; pool 71, $2.15@$2.25; pool 9, $1.95@$2.15; pool 10, $1.75@$1.85; pools 11 and 18, $1.60 @$1.70.

Pessimism is unabated in the Buffalo bituminous trade. Complaint is made that coal is forced and prices suffer. Slack has weakened. Nominal quotations are: Fairmont lump, $1.50@ $1.65; mine-run, $1.30@$1.45; slack, $1.10; Youghiogheny gas lump, $2.15@ $2.35; Pittsburgh and No. 8 steam lump, $1.85@$2.10; gas and steam slack, $1.30 @$1.50; Allegheny Valley mine-run, $1.60@$1.85.

Demand Quiet in New England

In New England there is no spot buying of any moment. Smokeless coals are firmer than a week ago, but this is owing partly to actual purchases already made for users of British coals, although most of the price advance can be attributed to possible export demand later on. Consumers apparently are not at all anxious over prices the next few weeks. Potential production is so great that the effect of the British strike lasting but a few weeks will be discounted.

On board vessels at Hampton Roads the asking price ranges $4.75@$5 per gross ton, a marked upswing from the April average. So much depends upon the course of export business the next week or two that it is difficult to forecast conditions on Pocahontas and New River, but if the Welsh mines do resume soon the market here will again sag to the pre-strike basis.

Central Pennsylvania remains in the doldrums. Only a minimum tonnage is moving and the totals for this territory must be relatively small. Even high grade forge coals are in extremely light demand.

On cars Boston and Providence for inland delivery there is only mild request. Most factors have on hand coal that was received on the April basis and quotations are only moderately firm. A few are asking $5.75 per gross ton, but inquiries for 20- to 50-car lots disclose a willingness to shade that figure considerably.

New York Bituminous Trade Quiet

"Calling off" the British strike made no impression on the New York bituminous market because there had been so few orders placed for foreign shipment. Distress tonnage has practically disappeared, but domestic industrial consumers show no disposition to increase their stocks of coal. There is, however, a fair volume of tonnage moving to meet current requirements.

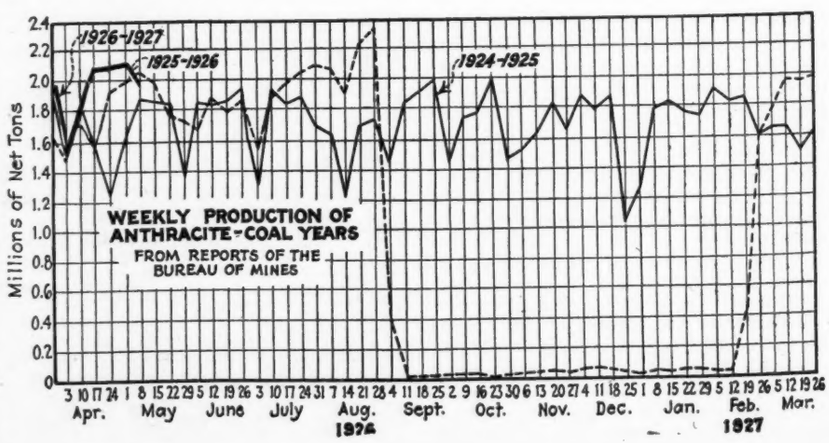
Philadelphia was another market in which the British situation had no influence. As at New York, buyers seem content to let things drift on as they are and little contract business has progressed beyond the inquiry stage. At Baltimore, on the other hand, there has been a revival of interest on the part of the consumers of steam tonnage, but the revival was not strong enough to lift up the spot-price levels.

Seasonal declines are less marked than usual in Birmingham territory. The small surplus of better grade coals thrown on the spot market is easily absorbed, but the lower grades are less fortunate. Contract customers are taking their full quotas. The bulk of the domestic coal now moving is on contracts. Nut and egg are in better demand than lump. The lower grades of white ash still are backward. Domestic coke is a little stronger at $3.25@ $3.50 for nut and $4.75@$5 for egg. The foundry market is quiet; spot coke is $6@$6.50 and contract, $5.50.

Anthracite Market Sluggish

There is no snap to the anthracite market at New York. Company domestic tonnage, however, is moving steadily, but buyers will not pay fancy premiums for independent coal. Retail stocks are fair, but it is expected that these will be reduced by pre-vacation fill-ups. The steam sizes are sluggish. No. 1 buckwheat is the weakest, but rice also is soft. Barley shines by contrast.

Demand for domestic sizes at Philadelphia is dwindling. Householders are reluctant to order their next winter's fuel and dealers do not want to accumulate heavy stocks. The majority of the shippers have unbilled loads at the mines and independents are shading



Car Loadings and Supply

	Cars Loaded— All Cars	Coal Cars
Week ended May 1, 1926	995,641	165,627
Preceding week	973,304	166,586
Week ended May 2, 1925	981,711	149,218

	—Surplus Cars— All Cars	Coal Cars	Car Shortages All Cars	Coal Cars
May, 1926	276,573	115,205	.....	.....
April 23, 1926	286,203	126,959	.....	.....
April 30, 1925	337,181	160,913	.....	.....

nut quotations to effect sales. Pea is scarce. Of the larger sizes, stove is in the most active demand. Barley moves with little difficulty, but No. 1 buckwheat is offered as low as $2 and rice quotations are off 25 to 35c. The Baltimore trade is quiet.

Lake shipping is well under way at Buffalo. The latest weekly report shows clearances of 59,600 tons, of which 29,000 tons went to Milwaukee, 11,000 tons to Sheboygan, 8,000 tons to Chicago, 6,900 tons to Washburn and 4,700 tons to Manitowoc. Local business has been sustained by weather conditions. The temperature also has been responsible for retail activity at Toronto, but this is easing off. There is a growing demand in Ontario for Welsh coal.

Dullness still characterizes the spot market for Connellsville coke. Despite curtailed production, there is still a scramble for the little spot business that appears from time to time, with the result that some spot furnace coke has sold down to $2.90. Small lots are held at $3. Spot foundry holds at $4 @$4.50, but the undertone is weak.

Output from the Connellsville and Lower Connellsville ovens during the week ended May 8 declined 9,070 tons, according to the Connellsville *Courier* The greater part of this loss was in the output of the furnace ovens. The total from those ovens was 89,500 tons, a decrease of 7,900 tons. Merchant-oven output, 70,840 tons, was 1,170 tons less than during the preceding week.

Foreign Market And Export News

How British Coal Strike Affects Europe

Continental Europe industries normally dependent upon Great Britain for a substantial portion of their coal supplies view the tie-up of the British coal mines with growing concern. Coal-producing interests of those countries, on the other hand, express great confidence in their ability to keep the wheels of trade turning by speeding up their output.

The Spanish iron mines, says a late cable to Washington, are anticipating serious inconvenience as a result of the British strike, although the coal-mining industry is optimistic regarding its ability to supply the demand. The iron industry probably is not seriously affected because of the restrictions recently decreed by the Spanish Government against the use of British coal.

The French coal industry is pushing production in an effort to fill the gap made by the stoppage of British deliveries, while prices have not as yet been affected. Probably Belgian and German shipments will supply the deficit, especially if the restriction on free German coal (that not imported on reparations account) is removed.

French production of coal and lignite totaled in March 4,566,000 metric tons as compared with 4,088,000 in February. Coke production amounted to 319,000 tons in March, which is over 40,000 tons more than in February, while the production of briquets reached 327,000 tons in March, a slight reduction when compared with the previous month. Production during April is estimated to have reached new high levels in anticipation of the British strike.

Prices of industrial fuel are as yet unchanged but increases are expected should the strike in Great Britain continue. The price of indemnity metallurgical coke is to be approximately 190 fr. per metric ton on June 1, an increase of 47 fr. in five months.

At a general meeting of the Czechoslovak coal miners' union on May 6, it was resolved that no increase in coal exports be permitted during the British coal strike. The railway unions support the action.

Owing to large existing stocks of coal in Italy, no apprehension is felt on account of the British coal strike. Buyers are declining to place orders at higher prices.

No Change in Belgian Situation

Brussels, Belgium, May 7. — There has been no marked change in the Belgian coal situation. The undercurrent of improvement noted in recent reports continues. Industrial demand is good. The rate of foreign exchange, the absence of German competition and the strike in Great Britain all combine to give the Belgian mines the full advantage of this situation. The Borinage district in particular is feeling the beneficial effects of these factors.

Inquiry is very strong for semi-bituminous and lean beans 8 mm. x 20 mm. of the stocks are almost exhausted. Semi-bituminous and lean peas also are in good demand. Coking smalls are sought after between 87 and 88 fr. as well as lime duffs at the newly increased price of 72 fr. per ton. Lean duffs and cement duffs are asked for and even fairly scarce at 42@45 fr. per ton.

The situation in domestic fuels also is improved.

During March Belgium imported 701,665 metric tons of coal, 226,031 tons of coke and 7,304 tons of patent fuel. Germany was the principal source of supply. During the same month Belgium exported 127,214 tons of coal, 84,995 tons of coke and 65,420 tons of patent fuel. France was her best customer.

Coal Strike Threatens Poland

The Polish Silesian coal fields, which are the principal source of Poland's coal supply, are threatened with a possible tie-up because of demoralization of the railroads and the likelihood of a miners' strike. The operators are unable to move their daily output of 80,000 tons. The miners are demanding a 30-per cent increase in wages, asserting that the German miners across the border are receiving 500 per cent more than they.

Export Clearances, Week Ended May 13

FROM HAMPTON ROADS

	Tons
For Canada:	
Dan. Str. Thrompenberg, for Gaspe	2,779
Swed. Str. Bore, for Montreal	4,218
Br. Str. Ryburn, for Quebec	2,314
For Spanish Morocco:	
Nor. Str. Spes, for Ceuta	1,494
For Brazil:	
Jap. Str. Naples Maru, for Rio de Janeiro	7,336
Braz. Str. Mandu, for Pernambuco	4,029
Grk. Str. Maria Stathatos, for Rio de Janeiro	6,588
Br. Str. Dovenby Hall, for Rio de Janeiro	6,588
For Tunis:	
Ital. Str. Lodovica, for Sfax	4,891
For Gibraltar:	
Jap. Str. Etna Maru	9,216
For Cuba:	
Amer. Str. Glendoyle, for Guantanamo	2,965
Nor. Str. Gro, for Havana	4,414
For Dutch East Indies:	
Du Str. Madaera, for Batavia	644
For Egypt:	
Br. Str. Oanfa, for Port Said	2,317
For Barbados:	
Nor. Str. Marstenen, for Bridgetown	2,817
For Miquelon:	
Nor. Str. Marga, for St. Pierre	1,595
For Bermuda:	
Amer. Schr. Albert H. Willis, for Hamilton	789

FROM BALTIMORE

For Egypt:	
Br. Str. Eastern City, for Alexandria	7,383
For Cuba:	
Am. Str. Delfino, for Guanico	502
For Italy:	
Ital. Str. Alberta, for Savona	6,591

FROM PHILADELPHIA

For Cuba:	
Nor. Str. Ringshang, for Habana	——

Hampton Roads Coal Dumpings*

(In Gross Tons)

	May 6	May 13
N. & W. Piers, Lamberts Pt.:		
Tons dumped for week	165,662	161,743
Virginian Piers, Sewalls Pt.:		
Tons dumped for week	63,740	66,191
C. & O. Piers, Newport News:		
Tons dumped for week	123,987	141,904

*Data on cars on hand, tonnage on hand and tonnage waiting withheld due to shippers' protest.

Pier and Bunker Prices, Gross Tons

PIERS

	May 8	May 15†
Pool 1, New York	$5.50@$5.75	$5.50@$5.75
Pool 9, New York	4.95@ 5.20	*4.90@ 5.20*
Pool 10, New York	4.70@ 4.95	*4.70@ 4.90*
Pool 11, New York	4.40@ 4.70	*4.40@ 4.65*
Pool 9, Philadelphia	5.10@ 5.40	5.10@ 5.40
Pool 10, Philadelphia	4.80@ 5.15	4.80@ 5.15
Pool 11, Philadelphia	4.25@ 4.50	4.25@ 4.50
Pool 1, Hamp. Roads	4.75@ 5.00	*4.50@ 4.60*
Pool 2, Hamp. Roads	4.50@ 4.75	*4.30@ 4.35*
Pool 3, Hamp. Roads	4.00	**4.02@ 4.19**
Pools 5-6-7, Hamp. Rds.	4.50	*4.15*

BUNKERS

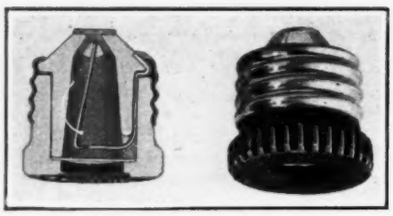
Pool 1, New York	$5.75@$6.00	$5.75@$6.00
Pool 9, New York	5.20@ 5.45	*5.15@ 5.45*
Pool 10, New York	4.95@ 5.20	*4.95@ 5.15*
Pool 11, New York	4.65@ 4.95	*4.65@ 4.90*
Pool 9, Philadelphia	5.35@ 5.65	5.35@ 5.65
Pool 10, Philadelphia	5.05@ 5.40	5.05@ 5.40
Pool 11, Philadelphia	4.50@ 4.75	4.50@ 4.75
Pool 1, Hamp. Roads	4.75@ 5.00	*4.90*
Pool 2, Hamp. Roads	4.50@ 4.75	*4.35*
Pools 5-6-7, Hamp. Rds.	4.50	*4.15*

† Advances over previous week shown in **heavy type**; declines in *italics*.

New Equipment

Fuse Shows When It Blows

Non-renewable and of distinctive design, the new fuse plugs shown in the accompanying illustration was recently placed on the market by the Trico Fuse Manufacturing Co., of Milwaukee, Wis. It is known as the Cleartop and consists of a separate porcelain base and body. The base is provided with a long baffle chamber that extends to the inside top of the body and holds the mica window in place. Body and base are held together by a heavy brass screw shell, the body being finished in a dull black that gives it the appearance of molded insulation.



Plug of Improved Construction

Shows side view and cross-section of new fuse plug. Construction is simple and rugged. The device is guaranteed to give unmistakable evidence of failure.

Some of the distinctive features and advantages claimed for this plug by the maker are: A large heavy knurl embraces the top edge, a clear India window is provided, as is also a visible link with the amperage stamped directly upon it, and a large central contact is employed. Each fuse is guaranteed to "show when it blows." This fuse is approved by the Underwriters Laboratories and is packed for the market in cartons of fifty.

Pen Charts Methane Content Of Mine Atmosphere

A continuous methane recorder has been developed by the Mine Safety Appliances Co., of Pittsburgh, Pa., and the new instrument will be placed on public exhibition for the first time at the American Mining Congress convention in Cincinnati, Ohio. This device is designed to reduce the probability of methane explosions in mines, as it will provide a means of continuously recording the proportion of methane in any split. It will likewise serve as a guide for regulating the fan or fans so that the content of this gas may be kept well below the explosive limit.

It has been demonstrated that rock-dusting will render coal dust non-explosive. If then the ventilation be properly regulated by means of one of these methane recorders the probability of a gas explosion, which is the only kind of explosion possible in a properly rock-dusted mine, will be greatly reduced.

In this recorder an electrically driven pump continuously draws in a sample of the mine atmosphere. This is then passed through a purifying chamber in which all dust or other particles of a solid nature are removed. It next passes through a canister containing chemicals that absorb all moisture and carbon dioxide.

It is then led to a flow meter that maintains a constant head or pressure in forcing it through an orifice of 0.014-in. diameter. This pressure is so regulated as to force ½ liter per minute through this orifice, any excess being bypassed to the outside air.

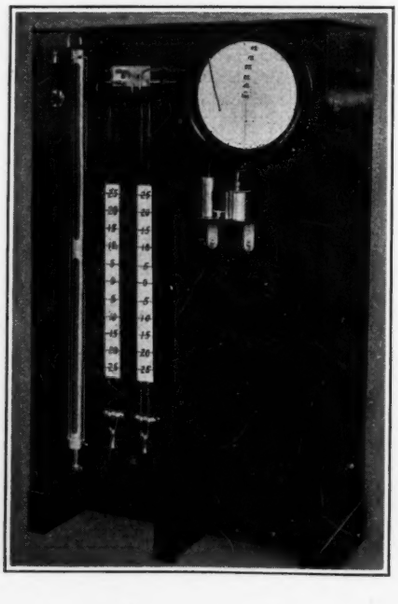
This ½ liter of the sample is then led through a fused silica tube containing platinized asbestos which by means of an electric furnace is maintained at a temperature of 800 deg. C., or 1,472 deg. F.

This high temperature and the catalytic action of the material within the tube serve completely to oxidize any methane that may be present to carbine dioxide and water. Another canister filled with chemicals completely removes these products of combustion.

The remainder of the sample is next led through an equalizer that brings it back to its original temperature. It is then forced through a second orifice of the same diameter as the first namely, 0.014 in.

If no methane is present in the first instance, the volume will remain constant, and the head, or pressure, required to force it through the second orifice will be the same as that necessary to drive it through the first. If methane is present in the original sample the volume of gas passing the second orifice will be less than that passing through the first, and the pressure required to force it through naturally will proportionately be smaller. This difference in head is registered by means of a sensitive pressure gage, the chart used being calibrated to read in percentages of methane.

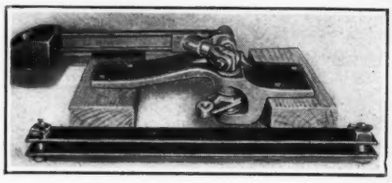
The chart employed covers a range from zero to 4 per cent and, it is said, can be read with accuracy to a few hundredths of one per cent of methane.



A glance at this chart will thus show the proportion of methane present in the mine atmosphere at any moment. The chart is made for one day's operation and the two canisters of chemicals are good for one week. Keeping the instrument in service is said to be a simple operation.

Parallel-Throw Switch Is Low, Compact and Durable

Designed to afford maximum service at minimum cost, the new parallel-throw switch stand shown in the accompanying illustration has been placed on the market by the West Virginia Rail Co., of Huntington, W. Va. This stand is made in two sizes, the first intended for rails weighing up to 40 lb. per yard and the second for those weighing 45 to 60 lb. per yard. Both crank and lever shafts are supported by double bearings. In consequence none of the working parts overhang and the inevitable bending stress and wear are avoided.



Switch Stand and Rod

This stand is low and of unusually rugged construction. When the connecting rod is rigid as here shown the switch is self-locking, but when provided with a spring it becomes automatic in operation.

All bearings are reamed from the solid metal, assuring the best conditions for slow-moving journals. The design is such that an increasing pressure is applied to the switch points at the extremities of the throw. The stand is low, thus offering a minimum of obstruction. When equipped with a rigid connecting rod as shown in the illustration the device is self-locking.

A hexagonal hole in the crank accurately fits the hexagon steel crankshaft, making transmission of the turning movement positive. The crank is placed at such a height as to be in alignment with the switch bar, thus avoiding offsets and consequent bending stresses in the connecting rod. As a special safety connecting-rod bolt is used to hold the rod, both stand and switch points are protected from breakage should a trip run through the switch, provided the rod is of the rigid type. This bolt is easily replaceable when broken or sheared. The entire stand is made of steel and malleable iron and is thus extremely strong and durable.

A New Welding Torch

To meet the demand for a small welding torch, the Alexander Milburn Co. has developed a torch that is 18 in. long and weighs 25 oz. It is known as the type J-Jr. In design it is sturdy and compact. It uses the same tips as are supplied with the standard torches of larger size and is said to be adaptable to all classes of welding. It can use gas supplied either from generators or compressed in tanks. It uses low and comparatively equal pressures of oxygen and acetylene.